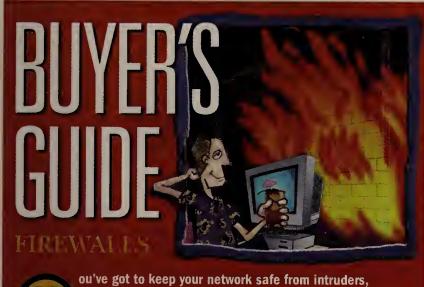
With its World Cam merge pending, MCI looks to ease regulators fears by selling off some Internet business. Page 8.

NEWSWEEKLY



and a firewall can be your first line of defense. Our Buyer's Guide will help you make the right choice when purchasing one of these essential appliances.

We brought eight leading firewalls into the lab for a head-to-head comparison. As with a similar test last year, none could top Check Point Software Technologies, Ltd.'s FireWall-1 — it again took home our Blue Ribbon.

You can check out details on dozens more firewalls in our product chart, either in print or on Network World Fusion (www.nwfusion.com). The online interactive version will help you find the firewall that best meets the requirements you specify.

We've also included a story that highlights trends in the firewall market to help you decide what to look for as you make your buying decision.

Coverage begins on Page 53.

DSL is one big mess

By Tim Greene

It was bad enough when we had two types of 56K bit/sec modems, but how would you like to wade through over 10 flavors of digital subscriber line (DSL) technology, none of which is compatible with any of the others?

That is exactly what carriers face when they try to bring DSL services to market, slowing down and complicating deployment and confusing the heck out of anxious customers.

DSL is one of today's most See DSL, page 78

Intel lean client in prototype

By John Cox

Network Computing Devices, Inc. (NCD) and Intel Corp. this month will unveil a new generation of highly managed Windows terminals, the first fruit

of Intel's lean-client guidelines.

The prototype terminals, to be shown at PC Expo in New York, are flat pizza-box-style devices (see photo, page 79). They will See Thin clients, page 79

Island's Buccaneer Bay Club and the occasion was the latest in our series of Gigabit Ethernet dinners, which took place during the recent NetWorld+Interop 98 show here. Unlike our first three feasts, which featured lively discussions among top executives from Gigabit Ethernet pioneers

Foundry Networks, Inc. and Prominet Corp., this time we gathered early adopters of the high-speed network technology. After all, the stuff is actually shipping now, so we figured it made more sense to talk to the people using Gigabit Ethernet products

Changing our guest list proved See Gigabit Ethernet, page 16

Cabletron: ATM line complete

Home-grown 10G switch to debut, giving firm end-to-end offerings.

By Jim Duffy

San Jose, Calif.

Cabletron Systems, Inc. this week will roll out a 10G bit/sec campus switch that for the first time enables the company to offer an end-to-end line of homegrown ATM products for enterprise networks.

At the ATM Year 98 show here, Cabletron will unveil the SmartSwitch 6500, a mid-range ATM offering that fits between the company's SmartSwitch 2500 wiring closet product and highdensity SmartSwitch 9500.

"This is the first time [the company] is going to announce a complete ATM strategy," said one source who asked not to be named. "In the past, when customers would hear ATM, they would very rarely think of Cabletron."

Cabletron, which declined to comment, presumably is looking for its buffed-up ATM product

line to win some sorely needed market share and put the focus back on the company's technology. Cabletron has had its share of distractions of late, including a management upheaval and a stock price that has fallen near its 52-week low.

Cabletron is targeting a worldwide ATM market that will reach \$4.3 billion next year, according to Vertical Systems Group in Dedham, Mass. Almost \$3 billion of that will be spent on equipment for enterprise LANs and See Cabletron, page 80



While ATM didn't make the cut for GMAC's Niraj Patel, it is becoming a staple at all levels of networking.

Page 10.



Users gnaw on gigabit

By Michael Cooney and Robin Schreier Hohman

Las Vegas

Outside, bombs were bursting, pirates were sword-fighting and boats were sinking — it seemed like a good place to talk about the perils of implementing Gigabit Ethernet.

The scene was Treasure

such as Alteon Networks, Inc.,



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On one line you've got a user who can't get on the Internet.

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And it's good for you because it gets you out of the trenches and lets you direct the battle.

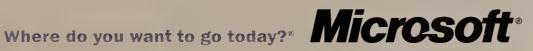
Instead of dealing with someone on the third floor who can't find his memo on the server, you have the time to tailor your system to give your salespeople price-comparison capabilities in the field, for example.

The foundation of any Digital_Nervous_System is software that acts alike, works alike, thinks alike.

Microsoft® Windows®, Office, BackOffice® and Visual Studio™ provide an ideal foundation for a Digital_Nervous_System because we built them, from the ground up, to work together in the same familiar way.

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The Bigger Picture. Something to think about, anyway.



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SLA ENFORCER

Larscom's new frame relay access devices can help customers track carrier service-

11/1/1/

level agreements.
Page 29.



Columnist Linda Musthaler says Novell needs to pump up its marketing efforts. Page 51.



REDEFINING

Sun CEO Scott McNealy says the last place you'll find network computers is on corporate desktops. Page 8.

FND «FISIN

To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.



NetworkWorld

www.nwfusion.com

This Week

Only on Fusion

VPNs. Our Fusion Face-off on VPNs last week generated quite a few interesting questions and comments. See what our debaters and readers had to say, then jump in with your own thoughts.

DocFinder: 7228

Firewalls. Read our firewall review and buyer's guide (page 53), then come online for our exclusive interactive buyer's guide, which lets you find a firewall that meets your specific criteria. **DocFinder: 7321**

Management. Last week, we presented the case of Bob, a systems manager with a boss from hell. Come online to see how others would have dealt with his situation — and tell us what you would do.

DocFinder: 7332

Cryptography. Reference a resource page with links to past *Network World* articles and Internet sites on the topic. **DocFinder: 7334**

LANs. We've set up an archive for our Fusion Focus: The "High-Speed LANs" e-mail newsletter. **DocFinder: 7335**

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contact information; REPRINTS: (612) 582-3800.

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News briefs, June 1, 1998

Wintel duopoly facing the hammer of justice

Mith its antitrust case against Microsoft Corp. under way, the federal government is going after the other half of the Wintel duopoly: Intel Corp. According to news service reports, the Federal Trade Commission (FTC) will



soon file an antitrust suit against Intel, alleging fintel abuses its position as the dominant manufacturer of microprocessor chips for PCs. The chip manufacturer will also come under fire for allegedly bullying some computer manufacturers in to using only Intel chips. According to reports, the FTC will charge Intel with selectively withholding key technical information about its chips from PC vendors and chip manufacturers. The FTC later may file other charges against Intel, including allegations of predatory pricing and contract provisions.

Larry blasts Bill

Oracle Corp. Chairman and CEO Larry Ellison tore into rival Microsoft Corp. last week at the Harvard Conference on Internet and Society, calling the software giant's business practices "patently illegal." In the wake of the antitrust lawsuits filed last week by the U.S. Department of Justice and attorneys general from 20 states, Ellison gleefully blasted Microsoft and its Chairman and CEO Bill Gates, saying Microsoft has "an absolute monopoly."

"What Microsoft is doing is patently illegal. Think about it. If you want to build computers, you've got to ask Bill's permission," Ellison said. "If Bill wanted to triple the price on Windows, what would you do? You'd pay — you wouldn't have any choice."

Lucent faces strike threat

AT&T spinoff Lucent Technologies, Inc. may be a hot company on the stock market and in product launches, but it's still dogged by its AT&T legacy on one key front: labor relations. Some 44,000 Lucent workers were threatening to strike over the weekend unless Lucent reached a settlement with its two unions — the Communications Workers of America and the International Brotherhood of Electrical Workers. At press time, the unions were resisting Lucent management's desire to use additional subcontractors and shift some health care costs to workers and retirees. The deadline for settlement was midnight Saturday.

Intelligent operations

An industry group led by British Telecommunications plc is working to create standards that would allow third-party vendors to offer businesses customized services on public telephone networks. The group, consisting of BT, DGM&S Telecom, Inc., Microsoft Corp., Nortel and Siemens AG, will develop a specification for an open network interface. The specification is designed to encourage the development of applications, such as intelligent call-routing software, by software and systems providers. The group ulimately intends to make the specification a global standard via groups such as the International Telecommunication Union.

Better check your phone bills at home

AT&T late last week revealed that in July it will begin assessing a 5% surcharge on residential interstate and international phone calls. AT&T said it needs the money to pay subsidies ordered by the Federal Communications Commission for expanded universal service programs, including discount Internet access at schools and libraries. AT&T's move upset FCC Chairman William Kennard, who called it "premature, unwarranted and inconsistent with [AT&T's] own public proposals to the FCC," (for more information on this issue, see story on page 35).

IBM pack to ease e-mail burden

Big Blue teams with NationsBank to build E-mail Classification System.

By Marc Songini

IBM is preparing a new technology that will act as a sorting and replying station for companies buried under loads of e-mail.

For the past year, IBM's Lotus Development Corp. subsidiary, along with the IBM research division and IBM's Global Services Division, have been working together to create a high-end e-mail response system for NationsBank NA, based in Charlotte, N.C.

One major part of the project is the construction of a special automatic e-mail classifier. When completed, the classifier will probably first be released as part of Lotus Domino and later will become a generally available stand-alone product.

The classifier tool, dubbed the IBM E-mail Classification System, will handle a variety of tasks, including:

- Automatically routing email to the appropriate person or queue.
 - Generating replies.
- Allowing the end-user company to harvest valuable feedback that otherwise would be lost from the letters.

The most unique thing about the system is that the computers are calling the shots on how the e-mail gets sorted and delivered, said David Johnson, a manager at IBM research division. "[This] goes beyond the state of the art. . . . We use a machine that learns [from] the sample data. A person does not have to write the classifications. The system discovers it based on examples. You don't need an expert," he said.

This should come as welcome news to IS managers who are swamped with e-mail.

As is obvious to companies that engage in electronic commerce, the tidal wave of e-mail often results in untimely replies to messages, which frustrates customers, said Jim Deupree, principal at IBM Consulting's Banking, Finance and Securities Industry unit.

It also means companies have to shell out money to hire a staff to wade through the floods of e-mail.

NationsBank was no exception. In 1996, its average monthly flow of e-mail jumped from a few hundred to 20,000 — requiring an additional 100 staffers.

The e-mail was gathered centrally and then distributed through the bank once per day, printed, faxed and manually filed for tracking purposes.

The average response time for an e-mail was three days. Up to its eyeballs in electronic messages, the bank asked IBM to help.

With the IBM software, the

response time has already been shortened for NationsBank. "As an industry, I think we're playing [technological] catchup," said Michael Dafferner, senior vice president of home banking operations for NationsBank.

"The bottom line is the customer is getting better quality faster. People can respond on a more timely basis," he said.

While IBM does not preannounce products, it does intend to offer the classifier in some stand-alone product form, possibly within the next year.

Even now, Lotus consulting is at work trying to weave the categorizer into its Domino-based applications.

Other IBM divisions are working with customers on the classifier, as well.

The software currently runs on Windows 95, NT and AIX, and works with any e-mail program.

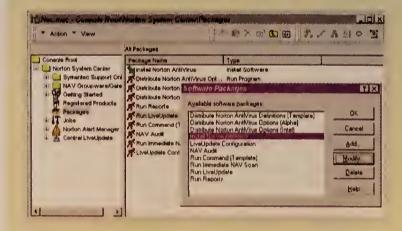
While the classifier concept is not a new one, the IBM categorizer is one of the most cutting-edge e-mail technologies being developed, according to one analyst.

"I would certainly classify it with the most sophisticated systems," said Chad Rider, a consultant with the Boston-based Patricia Seybold Group

"This is a new incarnation of an old technology," he said. ■

QUICK TAKE: NORTON SYSTEM CENTER

Symantec keeps software fresh



Symantec Corp.'s new Norton System Center (NSC) will give network administrators a new way to monitor and control workstations running the company's Norton software.

NSC allows administrators to schedule transparent workstation audits to see if virus checkers or software are out of date. If they are, the agents use an intelligent pull to gather the correct information across the network and update the workstation.

NSC runs on Microsoft's Management Console (MMC) Version 1.0, which is an extensible framework that allows third-

party software vendors to integrate management applications. Symantec's Norton group will ship MMC Version 1.0 with its products targeted for the new system, including Norton AntiVirus, scheduled to ship at the end of the month, and Norton Utilities and Norton Your Eyes Only, scheduled to ship by year-end, Symantec plans to add the functionality to pcANYWHERE, but hasn't set a ship date.

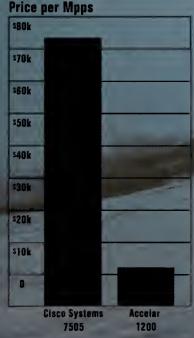
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Where Information Flows.

MCI bows to trustbuster fears, sells 'Net business

Cable & Wireless picks up MCI's Internet backbone business for \$626 million.

By Denise Pappalardo and David Rohde

Bowing to regulatory pressure, MCI Communications Corp. late last week announced that it is selling part of its Internet business to Cable & Wireless plc. for \$625 million in cash.

With the hope of appeasing the powers that be, primarily the European Commission (EC), the Department of Justice and the Federal Communications Commission, MCI is sacrificing its Internet backbone and wholesale Internet services business to London-based Cable & Wireless. MCI hopes the move will ease regulatory concerns over the carrier's pending \$37 billion merger with WorldCom, Inc.

The question is: Will the sale be enough?

"The only reason this was done was to address regulatory concerns," said Fred Briggs, chief engineering officer at MCI. "We believe we have addressed all of the concerns of both the EC and DOJ."

While MCI maintains it is selling 100% of its backbone network, the deal does not include fiber assets. MCI is selling infrastructure, which includes connectivity equipment such as the routers and switches that make up Layer 2 and Layer 3 of MCI's Internet backbone. The transport lines, at Layer I, which connect the routers and switches, will still be owned by MCI.

It's hard to tell if the specifics of the deal will cause a problem with regulators because the issue comes down to how you define an Internet backbone, said Johna Till Johnson, program director at META Group, Inc., a Stamford, Conn.-based consulting firm. Non-telco ISPs, such as the original BBN Planet and UUNET Technologies, Inc., did not own their own facilities. Therefore, it doesn't make sense that because MCI is a facilities-based company it would give up

Layer I network assets, she said.

Internet access users aren't too concerned with who will own the network, but are more concerned about quality. "As long as there is a good service

and sufficient bandwidth to do what I want to do, I don't care who owns the network, unless the management of the company is really screwed up," said Stan Kluz, manager of network services at Lawrence Berkeley National Laboratories in Berkeley, Calif., and former president of the California **ISDN** Users Group.

While Cable & Wireless will get all of MCI's ISP wholesale customer business, the company will not get MCI's business or residential customers.

But the deal does not satisfy

GTE Corp., one of the biggest opponents of the MCI/WorldCom merger.

"A partial sale of Internet assets will not be enough to address our concerns, and

> [the sale] will not solve the problem of Internet dominance," said Peter Thonis, vice president of external communications at GTE.

MCI is holding on to part of its customer base, which is not a total divestiture, he said. When BBN and UUNET were sold, all of their customers and employees were included as part of the

deal. That is not the case with MCI's deal with Cable & Wireless, Thonis said.

But analysts do not agree with this line of thinking. The EC has publicly said its bone of contention with the proposed MCI/WorldCom merger is the potential for MCI WorldCom to dominate control over Internet backbone traffic if the merger is approved, said David Goodtree, a director at Forrester Research, Inc., a Cambridge, Mass.-based consulting firm. Therefore, selling off MCI's Internet backbone should do the trick, he said.

But if there are other issues that have not been publicly addressed, then MCI has called the regulators' bluff, according to one analyst who wished to remain anonymous. And MCI has protected itself. The proposed deal with Cable & Wireless will go through only if the MCI/WorldCom merger is approved, according to the MCI and Cable & Wireless agreement, MCI's Briggs said.

Most of the direct pressure for the MCI divestiture came from the EC, not the FCC, said Len Elfenbein, president of Lynx Technologies, Inc., an international consulting and network integration firm in Fairfield, N.J.

"At the present time, American companies dominate the Internet in Europe," Elfenbein said. "The Europeans are concerned about the overall threat of American dominance, not any one player." MCI and WorldCom had little choice to act, he said, even though most of the legal pressure was coming from abroad. Reason: The FCC and the EC always coordinate and largely defer to each other's wishes on major regulatory approvals.

"The FCC and the Europeans play out their agendas over each deal," Elfenbein said. "It's like a high-stakes poker game, and each player gets to play the card they want. This is something MCI and WorldCom would have preferred not to do, but it's a minor thing in the scheme of the entire deal."

Because MCI and WorldCom have been forced to ante up part of their Internet business, Cable & Wireless may come out as a

See Cable & Wireless, page 16



MCI's Briggs: "The only reason this was done was to address regulatory concerns."

McNealy: NCs on desktops a long way off

Sun chief echoes comments made recently by Oracle's Larry Ellison.

By Chris Nerney

Cambridge, Mass.

Don't hold your breath waiting for a network computer (NC) to push your PC off the desktop.

That's according to Sun Microsystems, Inc. CEO and

"The last place you'll see NCs is on your desktop at work."

Scott McNealy, CEO and president, Sun Microsystems

President Scott McNealy, who last week told a Harvard University audience that Javabased NCs will be available in consumer devices "a long, long time before" NCs invade the corporate desktop.

"The last place you'll see the NC is on the desktop at work," McNealy said during a keynote speech at the second international Harvard Conference on Internet & Society.

McNealy said NCs are more than desktop machines designed to replace PCs and include Java-enabled consumer devices such as television set-top boxes, telephones, cellular

phones and smart cards.

But desktop NCs were the centerpiece of the original NC vision McNealy and Oracle Corp. CEO Larry Ellison began touting three years ago. Along with Ellison's recent comments that low-cost PCs will block NCs from the desktop market, McNealy's remarks last week have led some industry observers and

end users to question whether two of the industry's most vocal NC advocates are abandoning the corporate desktop market.

Ellison's and McNealy's comments have prompted IBM officials to reiterate that company's progress in the desktop market.

"I sold tens of thousands of these NCs last year, and I expect to sell hundreds of thousands this year," said Howie Hunger, director of channels and marketing for IBM's Network Computer Division.

For their part, Sun Microsystems, Inc. officials said the company remains committed to its JavaStation NC and the desktop market. Sun's NC was released in March, almost a year after the original ship date.

One analyst, however, said it's clear that Sun's and Oracle's desktop NC efforts have suffered from sluggish sales, product delays and a dearth of Java applications.

"They failed to deliver, and all the promises they made about [desktop NCs] were outrageous," said David Smith, an analyst at Gartner Group, Inc. of Stamford, Conn.

A user said she feared vendors might stampede away from the low-cost desktop market.

"If Sun and Oracle are abandoning the NC hardware market, other manufacturers will probably do likewise," said Juanita Bingliam, a programmer for the Washington State Department of Financial Institutions.

QUICK TAKE: KINNETICS NETWORK MANAGER

Loran plugs management appliance

Loran Technologies, Inc. has just begun shipping its Kinnetics Network Manager, a prebuilt Web server designed to find and report network problems.

The company claims Kinnetics

works as soon as it is plugged in and an IP address and default gateway address are keyed in. Once this information is established, the appliance immediately begins developing a physical map of the network along with an inventory of all attached devices. Using a Web interface, Kinnetics can create reports about service levels and traffic utilization.

The Pentium-based server runs Linux and can serve management data up to either Netscape Communications Corp.'s Navigator or Microsoft Corp.'s Internet Explorer browsers.

The price ranges from \$15,925 to \$117,275, depending on the number of network devices that need to be monitored.

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Who's watching your network

Users say ATM is far from dead

Cell technology is finding its place from the desktop to the carrier core.

By Tim Greene

Life has never been easy for ATM.

Since the beginning, other technologies have lined up to challenge it: First, there was LAN switching, then IP switching, then Gigabit Ethernet. But through it all, ATM has survived, and even thrived.

As users have discovered applications that require the unique attributes of ATM, the technology has successfully staved off its fre-



quently predicted demise. As the ATM faithful gather this week in San Jose, Calif., at ATM Year 98, they actual-

ly have much to celebrate.

"We thought ATM was the most scalable, fastest, most resilient technology. I wanted to put in a network that would be viable for many years. We don't want to have to revisit another major backbone upgrade in another year or two," said John Ospina, senior network engineer for Intermec Technologies Corp. in Everett, Wash. Last year the company installed a 15-switch campus ATM backbone.

Michael Kaltenbaugh, director of multimedia communica-

tions for Columbia Gas System in Reston, Va., said he chose ATM for interconnecting campuses because it offered flexibility to mix voice and data over single trunks. "It allows our PBXs to make decisions on routing rather than us trying to hardwire how we want to route traffic," he said.

There are enough customers such as Ospina and Kaltenbaugh to keep ATM flourishing. Indeed, even in the LAN market, where ATM is most vulnerable to competing technologies, it has progressed to the point that sales of ATM LAN switches are expected to top \$1 billion worldwide this year (see graphic).

When ATM came on the scene in the late 1980s, it was hailed as the technology of the future that would carry all voice, video and data traffic. Its potential was received so enthusiastically, though, that people expected more from ATM than could possibly be delivered right away, according to Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

"ATM followed the predictable course of new technologies. They're either overhyped or they are dead on arrival," Nolle said. "If they are overhyped, they will be overhyped for six months to three or four years depending on how complicated they are. And then they always fall precipitously from grace. That's what happened to ATM."

But ATM in the real world has matured to the point at which the technology delivers on its promise of carrying data, voice and video over a single network with guaranteed quality of service (QoS) for designated traffic, he said.

ATM is finding a home in LANs, campus backbones and in the cores of carrier networks. It is not ubiquitous, as some early proponents predicted, but it is making inroads into every level of networking.

To do that, ATM has had to

THE ATM STORY Prices are coming down . . . \$2,000 Price per port for ATM LAN switches \$1,600 -\$1,200 -\$800 -\$400 -Q3'97 Q4'97 ... while equipment sales are going up. Worldwide sales of ATM LAN switches (in billions) \$1.6 \$1.2 \$0.8 '97 '98 Worldwide sales of ATM WAN switches (in billions) \$1.6 \$1.2 \$0.8 95 '96 '97 '98

overcome the justified criticism that it is difficult to learn. ATM remains more difficult to work with than competing technologies, even with training,

Ethernet, said Esmeralda Silva, an analyst with International Data Corp. (IDC) in Framingham, Mass. Gigabit Ethernet can fill bandwidth needs now, as can ATM. But ATM can also be the platform for future applications such as video, she said.

strategic decision than Gigabit

Industries such as health

"Compared with 25M bit/sec ATM, the price/performance was much better for switched Ethernet, and the complexity was less. But we have been looking at ATM for our interbuilding traffic."

Niraj Patel, chief information officer, GMAC Commercial Mortgage

according to Jeff Fritz, principal network engineer for West Virginia University in Morgantown, which will install an ATM campus backbone this summer.

"ATM is getting easier, but it's still pretty complex," Fritz said. "The addressing is not particularly easy, and there are different variations on it.

"The technology is different from Ethernet, it's different from token ring, it's different from FDDI, and it's even different from ISDN," he added.

Fritz said it takes about two weeks of classes to properly train an IS staffer to deal with ATM.

But once IS workers get the hang of it, ATM is not that tough, according to Bill Homa, IT director for Hannaford Bros. Co. of Scarborough, Maine. The grocery chain uses ATM to connect LAN devices to its mainframe as well as for widearea links to 46 stores.

"ATM is fast, and it's easy," Homa said. "There's a little learning curve, but getting LAN emulation working wasn't very difficult."

Still not for everyone

Technical complexity aside, ATM still faces formidable competition. For example, when GMAC Commercial Mortgage in Horsham, Pa., recently upgraded its switched 100M bit/sec Ethernet LAN to Gigabit Ethernet, ATM was not even considered, according to Niraj Patel, GMAC's chief information officer. The company rejected ATM 18 months before as too costly, he said.

"Gigabit Ethernet was zero pain for a big gain in bandwidth," Patel said.

ATM in the LAN is more of a

care, finance and video production need the bandwidth and QoS levels that ATM offers, and companies in these industries

are the major buyers of ATM

LAN technology, Silva said.

However, faster speeds and plummeting prices for LAN switches make LAN bandwidth cheap enough that the miserly statistical multiplexing of ATM is generally just not necessary, CIMI's Nolle said. "Most business users will probably never need ATM in the LAN," he said.

In campuses and WANs, though, ATM can pay for itself through smaller phone bills. That makes ATM a viable option even if sending video is not a requirement.

In Hannaford's WAN, T-1 ATM lines have recently replaced 19.2K bit/sec satellite data links to stores. Voice rides with data on those T-1 ATM links. The cost of the ATM network is about the same as the old satellite service, plus the cost of voice phone calls

between the stores and corporate headquarters.

But there is a bonus. "I'm getting 80 times the bandwidth for the same cost," Homa said.

Beyond the corporate setting, ATM is finding a home anchoring the carrier networks of the future where "convergence" is the buzzword. To realize convergence, newcomers such as Williams Communications Group and Qwest Communications Corp. promise to offer IP data services as well as voice with guaranteed service quality.

That can only be accomplished on a large scale today through the use of ATM, according to Nolle.

"ATM is key to multiservice IP networks," Nolle said. "ATM has a unique ability to statistically multiplex multimedia traffic and still maintain service quality. Special-service interexchange carriers like Williams and Qwest are deploying ATM in the backbone because they have to meet the needs of their customers."

Carrier switch vendors have been working out how their gear can honor QoS requests from IP devices by mapping the requests to standard ATM QoS levels. That will be key to using IP intranets for more than just data.

New carriers that are just starting to build networks have an advantage over established carriers that must merge their old voice networks with data networks to achieve convergence. But even these established carriers say they will migrate to an ATM backbone

Carriers will help keep ATM kicking for the foreseeable future.

"ATM is not dead now," IDC's Silva said. ■



What university runs the interoperability test lab in charge of the Gigabit Ethernet Consortium, ADSL Consortium and Fast Ethernet Consortium?

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MAY WE OFFER SOMETHING FOR THE OTHER HALF?

Lucent leaps into IP switching

MCI will test PacketStar switch in hopes of boosting IP's real-time capabilities.

By David Rohde

Murray Hill, N.J.

Lucent Technologies, Inc. last week said it is going to compete tooth and nail with top data vendors to provide huge IP switching capacity.

32 million packet/sec in networks running speeds as high as OC-48 (see graphic). PacketStar will initially be sold to carriers and ISPs that are also being targeted by Cisco Systems, Inc., which is offering

Laboratories enable PacketStar switch to support up to 64,000 separate traffic queues. As a result, carriers who install the switch in their networks could assign numerous service levels to different queues and standardize them as service offerings to users. The service levels include everything from "virtual leased lines," with nearly guaranteed continuous throughput, down to pure best-effort service.

The switch will use Layer 4 to examine each packet's TCP protocol information and IP header. The switch will then base traffic decisions on application-oriented information such as the packet's type of service characteristics, explained Frank Dzubeck, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C.

"[The switch] will look at the entire header, including what precedes the IP header, and execute based on what's in the actual content of the

For example, the switch

is a voice call, a video stream Dzubeck said.

Lucent officials said enduser benefits — in terms of new carrier and ISP services keyed off the switch — could be far down the road. "The carriers are going to waltz into this," Dzubeck cautioned. "The trials are going to last a long time."

MCI Communications Corp. confirmed that the company will test the PacketStar switch for several months, though initially in a laboratory setting. "We'll put various loads on the unit, testing for interoperability with other equipment and so on," said Vinton Cerf, MCI's senior vice president for Internet architecture and engineering. "Plainly, we hope real-time traffic of various types can be supported."

MCI is also testing the Cisco and Ascend IP switch platforms.

Nevertheless, Lucent's new

or an extremely delay-sensitive terminal-to-host session. If delay-sensitive, the switch would give the traffic a clean path through the IP network while more delay-tolerant file transfers and messages waited their turn. The Cisco 12000 GSR performs a rougher calculation of traffic priority based on IP header information known as precedence bits,

Associate News Editor: Michael Cooney

NETWORK WORLD FUSION

IP products — which also include large-capacity IP

access servers and voice-to-

data gateways — are signifi-

cant. Until now, Lucent's

data networking strategy was

heavily focused on ATM

NetworkWorld

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Stars in their eyes

Lucent will use the names PacketStar and PathStar for new and renamed products in its growing data portfolio:

PacketStar IP Switch	Forwarding capacity (packet/sec)	Backplane capacity (bit/sec)	Availability
Model 6401	1 million to 2 million	Not applicable	Q3 1998
Model 6404	4 million to 8 million	32G	Q3 1998
Model 6416	32 million	128G	Q3 1998

Lucent also announced:

- PathStar Access Server supports up to 6,000 access lines and 2,000 simultaneous connections. It will be available Q1 1999.
- Internet Telephony Server-SP is renamed PacketStar Internet Telephony Server. Version 2.0 is available now.

The telecom equipment giant unveiled the PacketStar IP Switch, a multilayer device that could ultimately provide thousands of different levels of service quality for user IP applications.

The three models of the PacketStar switch deliver up to the 12000 Gigabit Switch Router (GSR), and Ascend Communications, Inc., which has its own GRF 400 and 1600 IP switches.

Bill O'Shea, president of Lucent's Data Networking Systems unit, said new algorithms developed by Bell

packet," Dzubeck said.

could recognize that the traffic

In-Site

Making sport of online graphics

By Andy Eddy

Shopping by browser obviously doesn't provide the same experience as browsing through the aisles of a store, where the customer can look over merchandise and analyze it up close.

But does online shopping really have to be that way? SportSite.com, an online sporting goods store based in San Jose, Calif., doesn't accept the electronic commerce status quo. Instead, the company has begun giving its customers the chance to better inspect the footwear, athletic gear and other products it has for sale. While SportSite.com users still can't physically pick up the goods, the wares can be viewed in the comfort of their homes or offices through a standard browser — and in far closer

detail than a normal Web site

Thanks to FlashPix graphics

technology, a Weboriented format developed by Live Picture, Inc., SportSite.com users have the ability to better examine a product's stitching, color and grain. The FlashPix format provides multiple resolutions of the same image in one file, and visually treats each image as a series of tiles. When the user clicks on a spot on the

graphic, the Live Picture Image Server references the next-higher resolution image and provides a tile from that section of the image with more

While Live Picture offers client-side viewing of FlashPix images through Java or a spe-



Web visitors can zoom in quickly for more detail.

cial plug-in, an alternative process, called Universal Viewing, enables the rendering of the image on the server side and outputs the result as standard HTML.

Brett Allsop, president of SportSite.com, says that using Universal Viewing provides stability to his company's site. "You just can't use Java in an e-commerce site, because it crashes too often. We would never have bought it," Allsop said.

Allsop also emphasized the importance of catering to the lowest common denominator in browsers. Many users' desktops just aren't yet equipped with the latest, greatest browsers, which provide more stable handling of Java.

Allsop admits that there are still some problems that have to be ironed out — the batch converter that's being used to modify SportSite.com's library of images into FlashPix format is an early version, and the Universal Viewing process gets blocked by some firewalls.

HP to pop two products for network service mgmt.

By Jim Duffy

Seattle

Hewlett-Packard Co. this week will unveil two OpenView products that the company will pitch as key enablers for network service-level management.

At the OpenView Forum International users conference here, HP will roll out NetMetrix 6.0, a performance management tool, and Network Node Manager (NNM) 6.0 for availability management. Both components will become key members of HP's network service management family, sources said.

HP said it would not comment on unannounced products.

Network service management is the practice of determining which network resources are available, how they are performing and who has access to them.

OPEN VIEW
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NetMetrix 6.0 combines hardware-based probes and analysis software for tracking network performance. NNM 6.0 is software that handles configu-

ration and fault management, the determinants of network availability.

In Version 6.0, HP is adding significant enhancements to NetMetrix, including visibility into Cisco Systems, Inc. Catalyst 5000 and 5500 switches, an Agent Manager for collecting data from multiple agents, more detailed reporting, and ATM and E-1 WAN probes.

The Cisco switch support allows users to discover and monitor Cisco switch events from an OpenView user interface. NetMetrix 6.0 monitors switch port usage by gathering port-level Remote Monitoring (RMON) statistics, and can steer traffic to an attached Fast Ethernet probe for more detailed analysis, sources said. NetMetrix 6.0 can also monitor individual virtual LANs (VLAN) by capturing and analyzing Cisco InterSwitch Link (ISL) packets. ISL is Cisco's VLAN tagging protocol.

The Agent Manager allows users to define, configure and launch multiple RMON probe and software agents. And NetMetrix 6.0's expanded reporting utilizes OpenView's discovery and SNMP data collection capabilities to detail the health and availability of interconnected devices. This includes out-of-the-box reports on Cisco 7000 series routers and Catalyst 5000 switches.

The ATM and E-1 probes allow users to track WAN usage by permanent virtual circuit, switched virtual circuit or committed information rate.

OpenView shop Duke Power Co. is not currently using NetMetrix but thinks Version 6.0 merits consideration.

"We're evaluating what we'll do in that space right now. I think [this product] would be a player." said Paul Edmunds, senior network analyst at the

Charlotte, N.C., utility.

Pricing and availability of NetMetrix 6.0 could not be learned by press time.

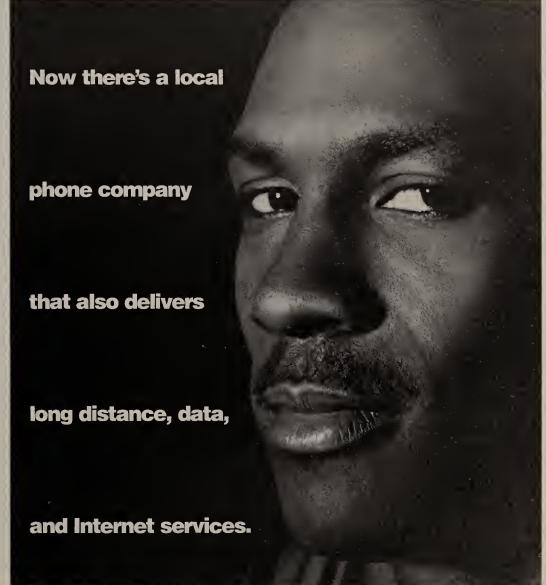
For availability management, NNM 6.0 will include out-of-the-box Web-

based reports on device fault, configuration and performance trend information in a Microsoft Corp. Excel spreadsheet. It will also provide management of Dynamic Host Configuration

Protocol IP addressing servers by logging address lease information.

NNM 6.0 is expected to ship this summer, and sources expect pricing to be between \$15,000 and \$20,000.





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to simultaneously send voice and data around the corner and around the world. Can your local phone company play that game?

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THE IT DIRECTOR is having heart palpitations in the elevator. He hates giving speeches. In less than an hour he'll be

in front of the entire IT department of the company. Rehearsing his speech in his head, he reminds himself not to forget to mention how successful the implementation of the new ¹ (employee self-service HR application) has been. The CEO will be there, so he also wants to point out that the ² (server consolidation program and Y2K* project are finished) and, most importantly, within budget. The elevator doors open. His ³ (pager) vibrates. It's an e-mail from his wife. She asks him to remember to pick up a tin of smoked eel on the way home. He bumps into the lead Webmaster in the hall who tells him that they've been able to take on new projects since they have dramatically ⁴ (reduced the backlog) on Website change requests. He makes a mental note to say something in his speech about how well the Web team is doing. He looks down and sees, to his horror, that he's wearing two different color socks.

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Gigabit Ethernet

Continued from page 1

to be a good move. The users, who represented a pharmaceutical company, a defense firm and a phone equipment maker, really got into the subject. Conversation jumped from deployment issues to what's missing from the technology to what still needs vendors' work.

While the restaurant is known for its great food, the cafe is also a perfect place to view Treasure Island's staged pirate battle. If you have not seen the show, every 45 minutes or so the British sail up in the hotel's faux bay to invade the pirate stronghold on Treasure Island — only to have their boat sunk in a fusillade of pirate cannon fire.

In the spirit of the pirate battle, our guests downed some wine, mead and buffalo steaks,

"We needed the switched capacity to our desktops for video and some other big applications, along with the ability to make moves, adds and changes rapidly."

Jim Squicciarini, manager of data services, Lockheed Martin

and began to talk about the treasure that is Gigabit Ethernet.

Philip Kwan, manager of network planning and operations for Incyte Pharmaceuticals, Inc. in Palo Alto, Calif., had the most impressive implementation story to tell. It seems he spent about \$4 million to replace his collapsed router backbone with Gigabit gear from Foundry.

"Our traditional router network was being pushed to 90% to 95% capacity for about 20% of our work week," Kwan said. "We were seeing complete network failures almost three to four times a month, which in our line of work was a serious problem, to say the least."

But that was only part of the problem. Kwan's group is trying to help discover the entire human genome system by yearend. The work is expected to help scientists better understand everything from drug interactions to disease diagnosis, treatment and prevention. The work, however, promised a four- to sixfold increase in network traffic. For a network that was expected to handle some 2T bytes of data throughput per day, something had to be done to prepare for that activity, Kwan said.

To make a long tale short, Kwan now has a Gigabit Ethernet backbone with switched 10/100M bit/sec capacity to every desktop. Since installation eight months ago, the Gigabit environment has not crashed, server sessions are no longer timing out and processes that previously took 14 hours to complete are being done in five hours, Kwan said.

A cannon shot interrupted Kwan's yarn. Most of the dinner participants went to the window to watch as the British bat-

> tlewagon took another hit. But Jim Squicciarini, manager of data services at Lockheed Martin Corp., took the opportunity to explain his company's move to Gigabit Ethernet technology.

"We decided first off that ATM gear was just too expensive," Squicciarini said. He said his firm had implemented some 300 Gigabit Ethernet switches, mostly from Extreme Networks, Inc., to some 4,000 desktops. "We needed the switched capacity to our desktops for video and

some other big applications, along with the ability to make moves, adds and changes rapidly. So far all of that is a reality with our Gigabit Ethernet backbone," Squicciarini said.

Whether it was the mead or the inspiration from the pirate battle outside, our dinner guests suddenly became feisty when asked what improvement

they would most like to see in the Gigabit Ethernet realm.

The topic of whether future Gigabit gear should support Jumbo Frame sizes sparked the most verbal swordplay. Jumbo Frames bump up the maximum Ethernet frame size from 1,518 bytes to 9,000 bytes. The idea is to use oversized packets to improve packet processing speeds between

switches and servers. The problem is that Jumbo Frame support is proprietary to a given vendor — Alteon has been a chief proponent — and the technology stretches the Ethernet standard beyond some experts' liking.

"There is just no excuse for building a high-speed Gigabit Ethernet pipe and shoving the itty-bitty little Ethernet packets — which by the way take as long to assemble as Jumbo Frames — down the chute," said Lee Damon, systems administrator for Qualcomm, Inc., a maker of telecommunications and e-mail products. Qualcomm has Alteon switches in a production net but is also testing gear from the likes of Cisco Systems, Inc. and Extreme.

"Jumbo Frames are BS. They are some engineer's pipe dream," Squicciarini chimed in. "If you want to drive new technology, I am behind you. But don't call Jumbo Frames Ethernet because Jumbo Frames is not Ethernet."

"Standards can change. If the standards committees would listen to what users want, then things would change," Damon retorted from the far end of our big oak dinner table.

"Yeah, then you'd be whining that none of these [multivendor] boxes would interoperate," Squicciarini responded. "Standards committees don't fix anything. It takes multiple vendors getting together and deciding what works and then going out and building it."

"Look, this is the same argument people had 10 years ago about mixing FDDI and Ethernet — today we have FDDI and Ethernet running happily together on routers," Kwan added.

"What? Who has FDDI? Nobody has FDDI happily running on routers today," Squicciarini said.

A waiter interrupted the exchange with dessert, which

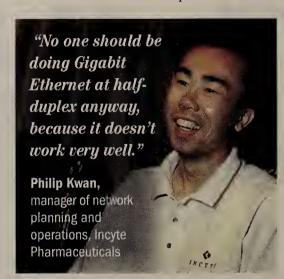
"There is just no excuse for building a high-speed Gigabit Ethernet pipe and shoving the itty-bitty little Ethernet packets down the chute"

Lee Damon, systems administrator, Qualcomm

caused a bit of an uncomfortable silence but seemed to clear the air a bit and calm everyone down.

After that exchange our dinner companions were more congenial.

For example, everyone agreed that Gigabit Ethernet vendors need to come up with



some better network management tools. Kwan was very specific in saying he wanted applications he could run on Hewlett-Packard Co.'s Open-View platform.

There was also unanimity on the auto-detect function of Gigabit Ethernet cards: It stinks. Auto detect determines a variety of important session set-up parameters — such as full- or halfduplex communications — that ensure two Ethernet or Gigabit Ethernet devices can talk.

"The first thing we look at if a user says his machine is slow is the duplex setting of the autodetect function, and nine times out of 10 that's the problem,"

"No one should be doing

Gigabit Ethernet at half-duplex anyway because it doesn't work very well," Kwan said. "And even if the card and the device say they are synchronized — don't believe it. You have to get in there and check — hard code, everything."

The users also agreed that vendors need to do a better job

of supporting multiprotocol traffic. For example, every vendor handles IP well, but few do a good job with IPX, the users said.

The vendors also need to handle routing protocols more efficiently, according to our dinner guests. There is some solid support for Open Shortest Path First, Routing Information Protocol and others in the Foundry gear, Kwan

said. But most other vendors' gear does not support that many protocols, he added.

As the dinner wound down and the pirate battles outside subsided, our guests agreed we had only begun to see the benefits and drawbacks of using such a relatively new technology. We extended invitation an to join us again in a year to see how things have progressed, and we will open up the invitation to other users who want to talk about their implementations. Next year we'll go to a nice, quiet Italian place though.

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Cable & Wireless

Continued from page 8

winner. Here is a company that has no substantial Internet assets to speak of but will hold a leading position in the worldwide Internet market once this deal is final. Cable & Wireless will be second only to WorldCom in the amount of Internet traffic it supports, experts agreed.

MCI and Cable & Wireless will have a two-year noncompete clause, which means Cable & Wireless can take its existing Internet operations and whip them into shape before MCI starts competing directly with the firm.

Some existing MCI Internet access customers are not jarred by the fact that Cable & Wireless

will be taking over their service.

"We really don't have any concerns about the change of ownership," said Mark Sanders, director of MIS at Meta-Creations Corp., a Carpinteria, Calif.-based graphic software company.

The service has been working well, and if the performance or reliability suffers, we then will consider changing service providers, he said.

The change in ownership may actually improve service, said Peter Hundt, information systems manager at Klukawan, Inc., a construction and tourism company in Juno, Alaska.

Kluckawan has been happy with MCI's Internet access services, but Cable & Wireless may be more focused on new services and management, he said.

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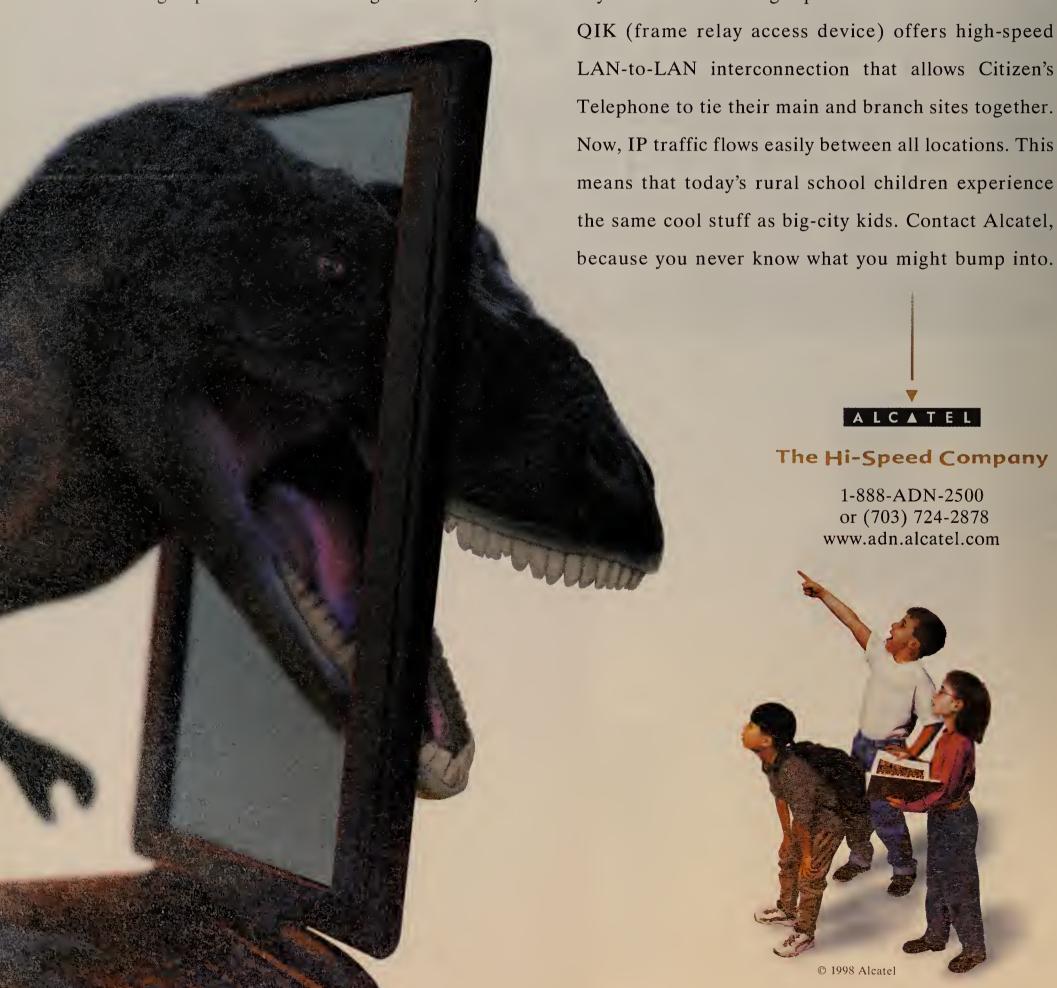


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Briefs

introduced a handful of network interface cards (NIC) that operate at 10M bit/sec or 100M bit/sec. The EtherPower II 10/100 Fast Ethernet PCI NIC comes bundled with

Remote LAN Wakeup technology, which enables LAN administrators to

manage



EtherPower II 10/ 100 Fast Ethernet PCI NIC

PCs from afar even when the devices are turned off. The autosensing card can operate at either 10M bit/sec or 100M bit/sec and costs about \$100. The card is available now.

The company also is offering new server NIC packages. The TigerArray package includes two 32-bit EtherPower II 10/100 PCI cards and SMC's Tiger-Array software, which balances server traffic loads across the two cards. The TigerArray2 package features a dual-channel EtherPower 10/100 PCI card, plus the load balancing software. Each package costs \$325.

© SMC: (800) 762-4968

Hewlett-Packard Co.
has unveiled a version of its
Windows NT LAN management software that
allows users to manage groupware applications from a single console.

Version 3.5 of HP's ManageX software includes more than 150 prepackaged management policies for applications such as Lotus Development Corp. Notes and Domino, Microsoft Corp. Exchange and SQL Server, and Oracle Corp. databases.

ManageX 3.5 also features a Web-based event browser that provides a persistent event data store and canned reports.

HP ManageX costs \$2,995 per console and \$795 per server. The software will ship this month.

© HP: (800) 752-0900

Novell continues along comeback trail

Profits are up and new products selling, but the company still has a long way to go.

By John Cox

Provo, Utah

Despite a third consecutive quarter of good financial news for Novell, Inc., users and analysts said the company has a long way to go before its comeback is complete.

The software firm posted revenue for the second quarter, ended April 30, of \$262 million, up \$10 million from first-quarter revenue. The company also turned a \$19 million profit for the second quarter. This is Novell's third straight profitable quarter after running up some \$137 million in losses over two quarters last year, including about a \$15 million loss reported in the second quarter.

"Before the arrival of [Chairman and CEO] Eric Schmidt, there seemed to be a lack of direction," said Patrick Corrigan, president of The Corrigan Group, Inc., a Tigard, Ore., consulting company. "Schmidt has really pulled it

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together and focused [Novell on its] core competency: support of network infrastructures."

But troubling signs remain that the company's turnaround effort could stall. For instance, Novell posted \$11 million less in revenue during the second quarter than it did in last year's second quarter.

"Obviously that [lack of growth] doesn't bode well," said Todd Chipman, a senior analyst with Giga Information Group, a technology research company in Cambridge, Mass. He said much of Novell's good financial news is the result of cost cutting, not new business.

"Eric has done a very good job in controlling the costs of running the business," Chipman said.

Novell reported that operational expenses in the second quarter were \$191 million, down about \$1 million from the first quarter. More impressively, Novell slashed its expenses by \$33 million vs. expenses in the second quarter last year.

Revenue from Novell's flagship NetWare line increased during the quarter, up slightly from first-quarter revenue to \$149 million. Revenue from NetWare 3.X actually jumped 30% in the second quarter to \$29 million with the release of

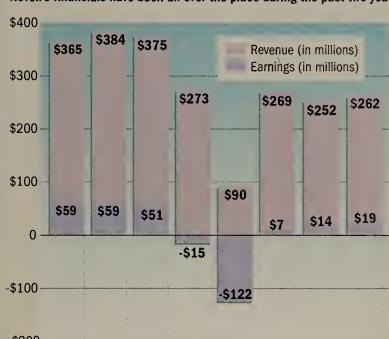
All manufacturers' total revenue in Q4 '97 was \$2.37 billion. In Q1 '98 total revenue was \$2.38 billion.

an "enhancement pack" to deal with the Year 2000 conversion. Revenue from NetWare 4.X fell about 5%, to \$125 million, from the first quarter. Novell

arsenal of products will be able to make up for lackluster NetWare sales. "It's too early to tell if their new product strategy is working," he said. For now,

NOVELL'S NUMBERS

Novell's financials have been all over the place during the past two years.



Q3 '96 Q4 '96 Q1 '97 Q2 '97 Q3 '97 Q4 '97 Q1 '98 Q2 '98

attributed the NetWare 4.X revenue decrease to the effect of NetWare 5.0's scheduled summer release.

Christopher Galvin, a technology analyst with Hambrecht & Quist LLC, a brokerage firm in San Francisco, is skeptical about whether Novell's new

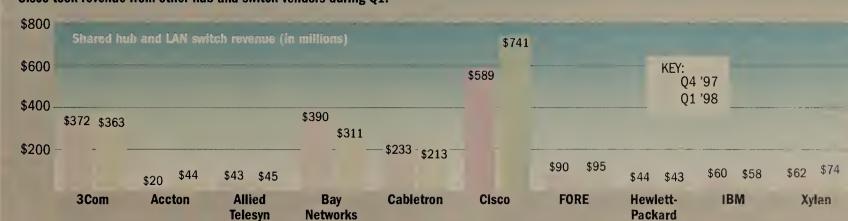
the brokerage continues to rate Novell's stock as a "hold," a status unchanged for the past two and a half years.

Chipman is a bit more optimistic. "NetWare 5.0 is going to be a good product for NetWare 3.X and 4.X customers," he See Novell, page 20

QUICK TAKE: LAN HUB AND SWITCH MARKET UPDATE

REVENUE LEADERS

Cisco took revenue from other hub and switch vendors during Q1.



SOURCE: OELL 'ORO GROUP, PORTGLA VALLEY, CALIF.

HP offers new mid-range server

By Marc Songini

Hewlett-Packard Co. last week announced a mid-range Windows NT server that's suitable for local and remote workgroups. HP's new NetServer LH3 sports up to two 350-MHz or 400-MHz Pentium II processors, a 512K-byte cache and 128M bytes of memory. The server is designed to handle database, file and other applications for up to 300 end users.

But perhaps most significant are the server's management capabilities.

HP has implemented a technology called IRQ inside its new server that

offloads from each CPU the job of negotiating multiple requests for each processor's attention. This technology enables each CPU to focus on processing information fast.

HP also offers a remote control card that works with the company's TopTools server management suite, which in turn can feed information to HP OpenView. The card fits into the LH3's PCI bus and allows users to manage the machine remotely via a Web browser. The management system allows net administrators to run online memory diagnostics and check for problems the server's built-in error correcting code tool can't see.

To accommodate growing numbers of users, the LH3 has 12 hot-swappable hard drives, twice the number of its predecessor, the LH2. Down the road, customers will be able to upgrade the LH3 to run four processors.

The LH3 moves to the head of the mid-range NT server pack, said James Gruener, an analyst with Aberdeen Group, Inc., a consulting firm in Boston.

"It really redefines the mid-range Intel server platform," he said. "It has a lot of features, manageability and flexibility that traditionally have not been in this level of server with an aggressive price point." Compaq Computer Corp., Dell Computer Corp. and IBM are not going to be far behind in offering competitive mid-range boxes, Gruener added.

A base two-processor model starts at \$5,000. The server will begin shipping at the end of June.

© HP: (800) 322-4772

Novell

Continued from page 19

said. "It will give them a good reason to actually upgrade."

"The key factor for NetWare 5.0 is its integration with TCP/IP," Corrigan said.

Today, NetWare uses Novell's proprietary IPX protocol, effectively cutting off NetWare-based information and applications from the Internet.

Steve Dube, an analyst with Wasserstein Perella Securities in New York, said that comparing this year's second-quarter revenue with last year's is not entirely fair. He noted that Schmidt has sharply curtailed shipments of software to the channel to draw down the channel's inventory. Dube has talked with NetWare 5.0 beta testers and said they "couldn't be more pleased."

Novell will be looking to NetWare 5.0 and other new products to offset declining revenue from discontinued and sold-off products, such as Unix and transaction processing monitor offerings. (Some of these products do continue to generate revenue for Novell through royalties.) Novell said products such as Novell Directory Services and BorderManager are already starting to deliver solid revenue, though the company did not reveal actual figures.



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Dumb Microsoft coverage

media attempt to cover the various law-

t's been fascinating, fun and a bit suits filed against Microsoft recently. scary watching the general news Whether it was the Justice Department and state attorneys general antitrust fil-

ings or the Sun Microsystems suit over Java, the national news media has said some hysterically funny things about operating systems, Web browsers and programming languages.

Reuters reported, for example, that one scribe at a Justice Department press conference asked Janet Reno if she would "... drop the Justice Department's antitrust lawsuit against Microsoft Corp. if company Chairman Bill Gates solves the millennium bug problem threatening to crash computers around the world?" How many Cobol programmers do you suppose are working in Redmond?

In a recent editorial, The Nation ran all over the map castigating Microsoft for monopolizing PCs, and compared the browser issue to a shampoo maker "bundling" a bar of soap with each bottle — as if a Web browser were just another free sample. In the end, it decided that big business is bad and big government is bad. The editors concluded, in essence, that "somebody ought to do something," but they weren't sure who and they weren't sure what.

Even those media outlets with knowledgeable technology reporters take those stories and filter them through editors and news anchors who have no idea what the story is about. With front page news (such as Microsoft vs. DoJ), it's the

star reporters who get the coverage, not the technology nerds, so the whole process (writing, editing, reading) is being done by people with no idea what they're talking about.



Dave Kearns

Fortunately, you and I have resources such as Network World and Fusion where competent

the stories together.

This isn't news to most of you, but perhaps you don't recognize the opportunity it affords you. For possibly the first time, your company's management and your non-IT co-workers are chatting about technology-related issues. Take some time to put together a digest of articles from Network World and other computer-related publications. Circulate it through the enterprise. Ask to explain the issues at staff meetings.

Seize this chance to become a resource, to be considered a corporate asset. These opportunities don't come along very often.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

PowerQuest Corp. has announced erverMagic, a NetWare server manage ment program that automatically copies a server's hard drive to a new one without having to back up or restore a single trustee right, NDS setting or byte of data. Once copied, ServerMagic allows the user to modify NetWare partitions as well as other partition types on the new server drive, saving a lot of time and money. For more information, see PowerQuest's home page at www.powerquest.com.



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Whether you need a firm understanding of networking technologies and applications or require a comprehensive update of current trends, this invaluable seminar will meet your needs. Packed with insights, Essentials of Networking and Data Communications is both informative and entertaining. This two-day seminar is developed and directed by Ray Horak, an internationally acclaimed network consultant, author and lecturer. Interactive case studies are incorporated into the seminar in order to illustrate the meaningful application of the critical technologies presented.

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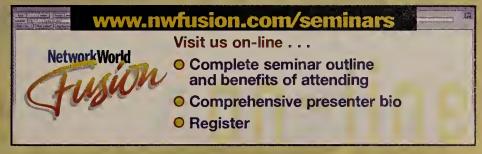
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- 6. Learn the nature of current and developing infrastructure technologies, including xDSL (ADSL, HDSL, IDSL and SDSL), Wireless Local Loop (WLL), hybrid local loops and SONET.
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Briefs

■ Novell, Inc. is offering a discount to users who upgrade to IntranetWare for SAA 3 SNA gateway software. The discounted prices range from \$995 for 10 users to \$31,995 for 1,000 users. Users with third-party NetWare DOS-based SNA gateways are eligible for the discounts. © Novell: (800) 453-1267

■ ADC Kentrox last week entered the virtual private network arena with DataSMART 900, a LAN edge device that authenticates, encrypts and manages public-key security for traffic bound to and from the Internet. DataSMART 900 sits between the customer router and the DSU/CSU leading to a dedicated Internet connection. The device requires remote client software called SecureVision Client and management software called SecureVision Administrator, Available now, DataSMART 900 and Secure-Vision Administrator cost \$4,395; the client costs \$99 per seat. © ADC Kentrox: (800) 232-

■ Users of IBM's older 3705, 3720 and 3725 front-end processors who upgrade to a new 3745 Model 17A FEP are eligible for a rebate of up to \$4,000 if they place their orders by Nov. 20.

5879

IBM also said owners of 8235 remote access devices who purchase a 2210 Multiprotocol Router are eligible for a \$500 rebate. Orders must be placed by

© IBM: (800) 423-4968

Applied Computer Technology (ACT) last week announced SNAsim, a PC-

based SNA host simulator that conducts high-performance SNA testing using Sunchronous Data Link Control, token ring or Ethernet links. SNAsim lets users create realistic test environments to perform product evaluations of 3270, 5250 and SNA gateway products. SNAsim is available this month, though pricing was not available.

© ACT: (972) 271-6550

Tivoli users share strategies

Plan management around business processes, but be prepared for long haul.

By Jim Duffy

Orlando

Tivoli Systems, Inc. users convened at the recent Planet Tivoli conference here to trade war stories and strategies on how best to implement the company's complex management software.

Users from Eastman Kodak Co., Travelers Insurance, Inc. and Florida Power & Light Co., shared their experiences of configuring their enterprise management environments and deploying Tivoli software to achieve their management goals. For some users, nine months was considered a relatively short period in which to establish a management strategy and deploy the Tivoli software. Others wish they could have done it in nine months.

"We began this project two and a half years ago. At that time, I had a full head of hair and was six feet tall," said a stout, balding David DeMarco, technology associate at Eastman Kodak.

What Kodak is doing would probably knock any IT administrator down to size. The \$15 billion photography giant has designed a "hub-centric" management environment in which three worldwide operations



centers, or hubs, are responsible for ensuring proactive, 24-7 management of Kodak's 100country global network.

Kodak is using the Tivoli Enterprise Console in each hub to monitor and control problem, change, configuration, event and software distribution management across 40,000 desktops and 2,000 servers on 400 LANs. The company is in the middle of a worldwide SAP R/3

rollout using Tivoli's Software Distribution application. Kodak has about 2,000 **SAP** clients installed and hopes to have about 18,000 deployed by the end of 1999, DeMarco said.

For a project of this magnitude, DeMarco suggests users link enterprise management processes to business goals rather than to specific devices or applications. For

instance, if SAP R/3, Lotus Notes and Microsoft Exchange are crucial for keeping business operations flowing smoothly, users should manage IT as a way to keep those business operations up rather than just monitoring individual SAP R/3 Notes or Exchange servers and applications.

"We start off by defining a process. That tells us what we must do," DeMarco said.

Travelers is also taking a business-process approach to enterprise management "to ensure that at the end of the day the thing that's delivered meets business needs and runs strong centralized technology that is low-cost and dependable," said Diana Beecher, senior vice president and chief information officer at the Hartford, Conn., insurance company.

Travelers is using Tivoli and Tivoli-acquired applications as the technology for addressing those business needs, which include event monitoring, problem management and asset tracking. But configuring Tivoli applications for an environment that can produce 15,000 events daily requires some assistance.

For this, Travelers recommends "prudent" use of Tivoli's Professional Services (TPS) organization. "If you use TPS too much, it's going to cost you a lot of money," Beecher said.

Florida Power & Light is seeing a healthy return on investment from Tivoli software on its enterprisewide Windows NT deployment project, said Nancy Mulshine, the utility's opera-

Larscom enters smart DSU/CSU fray

By Tim Greene

Milpitas, Calif.

Larscom, Inc. recently announced intelligent frame relay access devices that can track carrier service-level agreements (SLA) and reduce the time it takes to track down network problems.



Larscom's FramePath 100 Frame Relay DSU/CSU

Larscom's FramePath 64 DSU and FramePath 100 DSU/CSU contain probes that measure network transit delays, lost frames and congestion typical factors included in SLAs offered by carriers. FramePath devices can also help customers quickly determine whether network problems are caused by service provider failures or hardware failures within the customer's network, thus speeding repair times.

The value of intelligent DSUs/CSUs is that they keep carriers honest about their SLA guarantees, said Jim Howell, the information technology manager for Reeds Jewelers in Wilmington, N.C.

A real-time view of his network-provided smart DSUs/ CSUs enables Howell to determine whether network problems are the fault of the carrier or the fault of hardware at one of the Reeds sites. With Frame-Path. Larscom enters a crowded field that includes smart DSUs/CSUs from vendors such as ADC Kentrox, Visual Networks, Inc. and Paradyne, Inc.

Larscom has particularly stiff competition from Visual and Paradyne. Both companies

started making smart DSUs/ CSUs early on and offer richer data analysis, according to Elizabeth Range, an analyst with International Data Corp. (IDC), a research firm in Framingham, Mass. For example, in two months Larscom will add the ability to access DSU/ CSU data via the World Wide Web, but that's a feature other vendors already have.

Larscom's FramePath 64 supports line speeds up to 64K bit/sec, and FramePath 100 support port speeds up to 1.5M bit/sec.

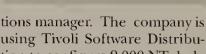
The FramePath devices also feature ISDN backup. Frame-Path 64 frame relay DSU costs \$1,495; it costs \$2,095 with the single BRI ISDN option. FramePath I00 DSU/CSU costs \$2,795; it costs \$4,595 with four BRI ISDN adapters. All units are available.

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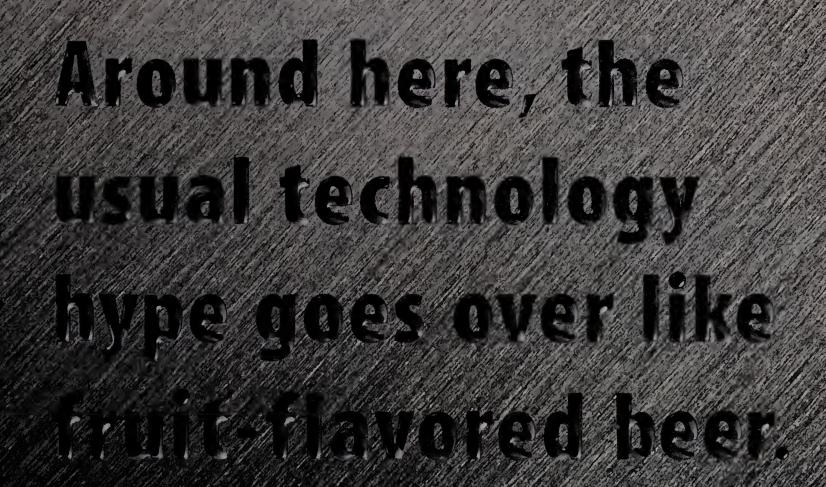


using Tivoli Software Distribution to configure 9,000 NT desktops at a rate of 350 per week.

"For every desktop we save five hours per year" with the Tivoli application, Mulshine said. This equates to about \$2.25 million in savings annually, she said.

In order to realize return on investment and cost savings, though, users must understand their business needs and design the management architecture accordingly, Mulshine said.





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INTERNETWORKING MONITOR

One giant step for High-Speed Token Ring

t's official, High-Speed Token Ring is here. Those of you present at last month's NetWorld+Interop 98 in Las Vegas got to witness the first display

of the new technology by Bay Networks, IBM, Madge Networks and Olicom.

Off-the-shelf production gear will be gushing forth from the industry

within 45 days.

But there are some items that need to be addressed to further take advantage of token-ring technology. • Link aggregation: As soon as HSTR ports appear, some network managers will find the need for more than 100M bit/sec between switches. Work on gigabit token ring begins in earnest in July, but don't expect any products until 1999.

Fortunately, "fractional gigabit" can be provided via link aggregation, whereby multiple physical links are used as a single logical transport. Such technology exists already, albeit in a proprietary way, in the 4/16M bit/sec switched tokenring world.

The Ethernet IEEE 802.3 committee has been working on a standardized approach to link aggregation for some time now (http://grouper.ieee.org/groups/802/3/trunk_study). There is

no reason that the token-ring standards committee, 802.5, cannot borrow that work and apply it to token ring. In fact, according to IEEE 802.5 chairman Bob



Kevin Tolly

Love, this work is already in progress.

• Broadcast management: Token ring's source route bridging approach provides for active redundant paths and load balancing — all at Layer 2.

However, the resulting enlarged broadcast domains can be a problem. Pesky broadcasts can waste bandwidth and endstation processing power.

Several vendors have developed effective, but proprietary, broadcast management schemes that intelligently filter out superfluous broadcast traffic. It is time, however, for an industrystandard approach.

The various vendors should offer their broadcast management knowledge to the IEEE 802.5 working group in an effort to construct a well-defined, vendor-independent offering.

• Source Route Redirect: Vendors have never capitalized on the significant intelligence that source routing builds into endstations. For lack of a better term, I've dubbed this capability Source Route Redirect (SRR).

In brief, instead of seeking out the best path between endstations only once per session, SRR drivers could be configured to perform that search periodically and migrate the session to a different path dynamically.

With relatively minor changes to the endstation adapter drivers, vendors could provide an unprecedented level of performance.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.



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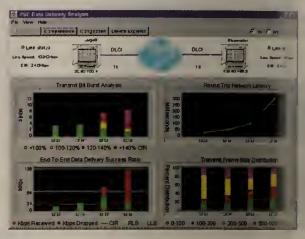
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Two ambitious Internet-inthe-sky satellite projects have *ugreed to merge.* Teledesic LLP, a planned 288-satellite roadband data communica-

'ions system headed by wire-'ess pioneer Craig McCaw, vill take over he Celestri system spearreaded by Motorola, Inc.



Teledesic's McCaw

n return, Motorola will get a 26% stake in Peledesic, whose owners include Microsoft Corp. Chairman Bill lates. Teledesic's low-earth orbit atellites have yet to launch, and service is not expected until 002 or 2003.

Electric Lightwave, Inc.,

Vancouver, Wash.-based cometitive local exchange carrier hat also offers long-distance and P services, has introduced

Remote NetConnect.

The service concentrates higholume remote-access Internet nd intranet traffic using Cisco ystems, Inc.'s AS5300 universal ccess servers. Remote NetConect will be available by July 31 1 Boise, Idaho; Los Angeles; hoenix; Portland, Ore.; Sacravento, Calif.; Salt Lake City; an Francisco; Seattle; and pokane, Wash. Nationwide cpansion of the service is in the

© Electric Lightwave: (800)

IGE Information Services

st week announced it would

love all of its network *affic to WorldCom, Inc.'s net-

ork starting July 1. By migrating customer traffic WorldCom's network, GE cusmers will have access to 658 ore dial-up point-of-presence

ses than they do today. GE Information Services cers customers electronic com-Pree capabilities based on electrnic data interchange, messagvy gateway, extranet and ectronic catalog services.

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User groups battle over universal fees

By David Rohde

Washington, D.C.

The battle lines are drawn for a war over the government's policy of expanding universal service programs. At stake for corporate users: minimizing the impact of new long-distance surcharges.

On one side is a coalition of consumer and business user groups. Late last month, four groups — the International Communications Association (ICA), the National Retail Federation, Consumers Union and the Consumer Federation of America — asked the Federal Communications Commission to stop collecting fees from carriers to fund the new E-rate program. The program is part of the government's effort to wire schools and libraries to the Internet.

On the other side are the American Library Association and the National School Boards Association, which are asking the FCC to keep E-rate funding going despite the user groups' complaints. E-rate provides discounts of 20% to 90% for Internet access, telecom services and some types of network equipment at elementary and secondary schools. It is paid for by expanded charges the government is placing on carriers.

The controversy is heating up as users are finally being hit with a wave of new charges by carriers to pay for E-rate, telemedicine subsidies and other universal service goodies.

The charges were first levied on carriers Jan. 1, but many of the larger carriers took several months to pass them along to users because the carriers needed time to change their billing systems.

Get more online:

Universal service definitions and documents from the FCC

A look at the fight between longdistance and local telephone companies over the Issue

The carrier moves have annoyed users, especially those who have recently renegotiated their carrier contracts. "What good is it to negotiate lower rates if the government is going

Anchor Financial Services Corp., a South Carolina bank holding company.

In April, Randall began a new AT&T contract term with long-distance rates 35% to 40% retroactive to January, which i when the E-rate program began.

Randall, who is based in Columbia, S.C., said he expect Anchor to come out ahead, but added: "I know of several cus tomers [for whom] the impact is greater than a million dollar a year. I don't believe [the FCC fully understands the ramifica tions of what they did."

FCC Chairman William Kennard has maintained tha long-distance carriers should not be passing along universa service charges because th access-rate reductions offse them.

He even went so far as to write letters to the CEOs of AT&T, MCI Communication Corp. and Sprint Corp. to tel them to stop blaming the gov ernment for the charges. Bu Randall, who is ICA chairman said Kennard's view is naive "You know [the carriers] ar going to pass it on, come hell o high water," he said. ■

Good news, bad news

Users are being whipsawed by government and carrier manipulation of local and long-distance rates and surcharges.

- Long-distance charges have been cut \$2.4 billion in the past year as a result of rampant discounting.
- Further local-carrier access rate reductions of \$700 million are due on July 1.
- Regulators say long-distance carriers should not be passing along any charges.

At the same time:

- Carriers have passed along a FCC fee of up to \$2.75 per phone line.
- Carriers have also tacked on surcharges of up to 5% to pay for expanded universal service programs.
- Another new charge of up to \$1 per line will start next year for local telephone number portability.

to turn around and negate them with new surcharges?" fumed Woody Randall, director of telecommunications for

lower than before. At nearly the same time, he said, AT&T and BellSouth Corp. imposed new line charges and made them

BellSouth gets into ADSL

New service to hit six cities by year-end.

By Tim Greene

Atlanta

BellSouth Corp. last week outlined a plan to roll out asymmetric digital subscriber line (ADSL) services in 30 cities by the end of 1999.

The service, called BellSouth ADSL, will give users broadband dedicated access to the Internet or to corporate networks over regular telephone wires. The maximum speed of the service is 1.5M bit/sec for downloads and 256K bit/sec for uploads.

BellSouth ADSL has become invaluable to Web site developer Bill Levey, a principal at Cahaba Internet Birmingham, Ala. He's had the service for six months through a market trial.

Levey said he needs highbandwidth Internet access to upload changes to his clients' Web pages and to exchange files with his business partner in

Los Angeles. Compared to the ADSL service, the 28.8K bit/sec modem he used before seems agonizingly slow, Levey said.

At \$59.95 per month, the ser-

must be within 18,000 feet of switching office that support the technology, and the circu must be of good enough quality to support the service.

BellSouth.net will offe BellSouth ADSL as part of a bur dle and will charge customer \$200 for a DSL modem and \$100 installation fee.

DSL FROM THE LOCAL GIANTS

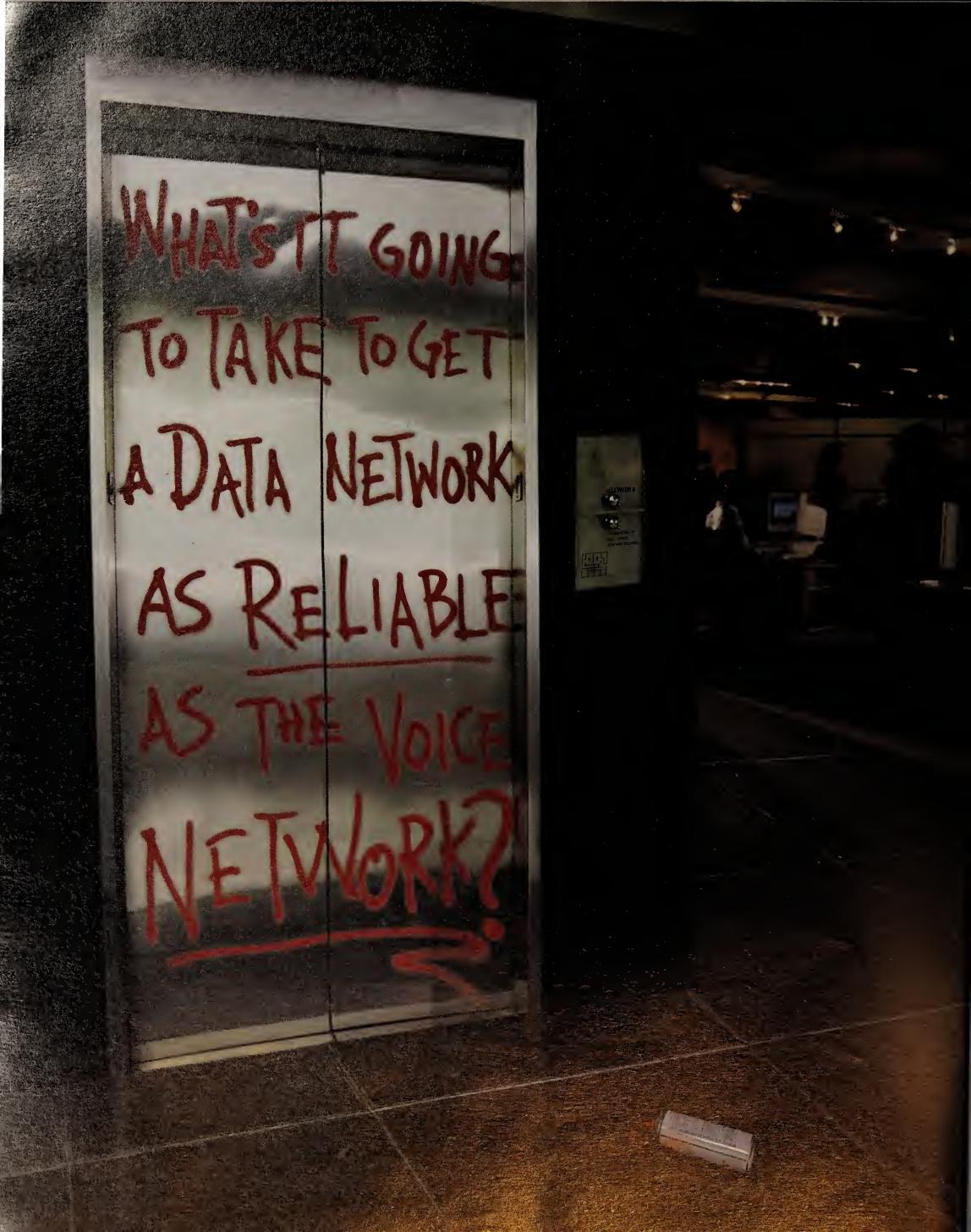
So far three regional Bell operating companies offer digital subscriber line service:

Company	Download/upload (bit sec)	Price per mont
BellSouth	1.5M /256K	\$45
Pacific Bell	1.5M /384K 384K /384K	\$250 \$135
US WEST	256K /256K 512K /512K 768K /768K	\$40 \$65 \$80
	1M/1.5M to 7M	\$120 to \$840

vice was also the most affordable option available.

Once BellSouth rolls out the ADSL offering, the service will be available to a limited number of customers. Eligible users

The BellSouth service will be offered this year in Nev Orleans, Birmingham, Char lotte, S.C., Jacksonville, Fla. N.C. and Ft Raleigh Landerdale, Fla.



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of reliability? For 128 years, we've built the most reliable networks on earth. And we bring that same level of reliability to data. We're building data networking products with self-diagnostic software. They monitor themselves. They fix themselves. We're also making most critical components redundant. Just to be smart. We know what the reliable data network of the future looks like. We can make sure that network is yours. We make the things that make communications work."



EYE ON THE CARRIERS

The ultimate vaporware?

ne of the unfortunate side effects of the telephone companies' drive to become big players in IT is that they rival hardware and software vendors for relent-

less hyping of undelivered products.

For example, what ever happened to AT&T's grand announcement in February 1997 of high-speed wireless

local access lines to bypass the regional Bell operating companies? (A tiny trial in the Chicago area showed the costs were too high.)

But for sheer shamelessness, it's hard to find anything that quite matches super-RBOC SBC Communications' recent announcement of a new "national-local strategy" to compete outside its region. If regulators would just allow SBC to acquire Ameritech, according to the strategy, SBC promises to finally compete against Bell Atlantic, BellSouth and US WEST in 30 of the RBOCs' largest cities.

Usually, when a company announces it intends to become a competitive local exchange carrier (CLEC) it offers a few details. Here are some of the basic decisions facing a new CLEC, followed by SBC's responses to me on these issues:

Which vendors' switching and transmission equipment will you use?

We don't have that yet.

How many route-miles will your new networks cover?

We don't know the answer to that.

There are three methods of CLEC entry: Resell the incumbent's services, lease unbundled network elements (UNE) or build all your own facilities. Which will you use?

In each market, we'll be determining over the next year which strategies fit in

each market — resale, UNE rebundling or facilities-based competition. (Thank you for repeating the question back to me.)



David Rohde

Why do you have to merge with Ameritech before becoming a CLEC?

We need the size and scope that we'll get by partnering with Ameritech because we don't want to do this piecemeal.

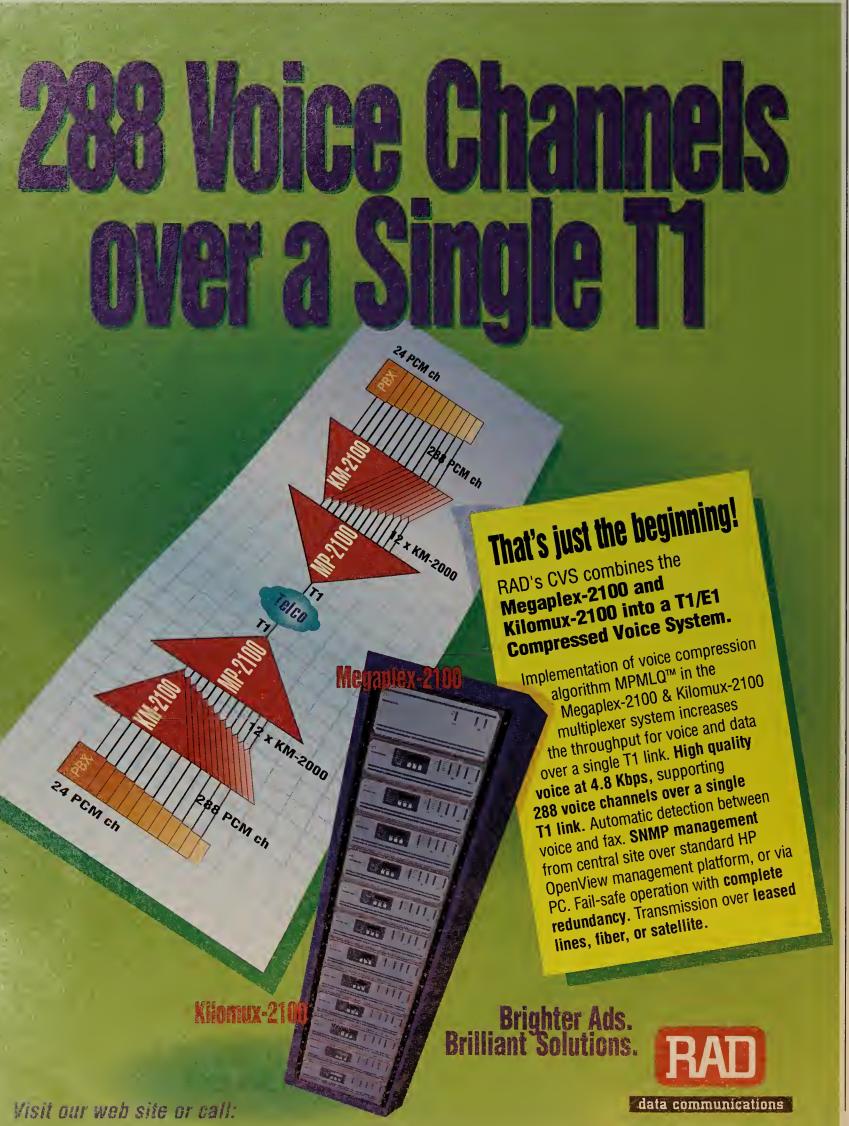
In other words, a \$41 billion company — the combined revenue of SBC and Ameritech — can do wondrous things that the mere \$25 billion SBC alone is helpless to pursue. Does that make sense to you?

The fact is financial analysts already consider SBC the healthiest, wealthiest carrier in the country. If SBC really wanted to become a CLEC, it could do so tomorrow.

But SBC's CLEC announcement wasn't aimed at you, the user. The announcement was aimed at regulators desperate to prove they haven't blown telecom reform by endorsing giant mergers. So the regulators ought to do a turnaround and think of themselves as users buying a CLEC service and ask all those same questions.

If they don't get better answers, when it comes time to rule on the merger, SBC's national/local strategy should be treated as what it looks like today — 100% pure unadulterated vaporware.

Rohde is Network World's senior editor of Carriers & ISPs. He can be reached at david_rohde@nww.com.



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To address these issues, Network World has assembled a team of IDC's most senior analysts in the areas of Internet technologies and services. The study is designed to assist buyers in better understanding how, where and when to use Internet services and technologies to support enterprise networking strategies. Importantly, the study includes the results of IDC's research with leading end user organizations and proprietary IDC cost models, developed in collaboration with major corporations around the world.

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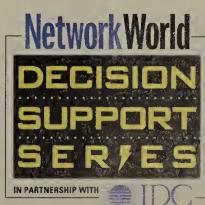
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Service-level agreements

Paying the price for service

ooking for a service-level agreement (SLA) to make sure your frame relay carrier doesn't get away with network outages, dropped packets and delayed transit? Great idea! Now get out your checkbook.

Don't misunderstand: It's not as if you actually buy a carrier SLA. You won't find a price tag for SLAs in carrier marketing literature, Web sites or tariffs. But increasing differentiation among classes of frame relay service — even from the same carrier — means you may have to pay more for a frame service that has a better SLA

In addition, nonstandard or negotiable credits and penalties often require you to sign a longer term contract or commit to more sites to get a higher network availability guarantee. Extending a long-distance carrier's SLA into the local loop usually requires a T-1 access line and sometimes a lease on the local carrier's Synchronous Optical Network (SONET) ring.

Finally, getting the information to prove your carrier has missed its performance promise often requires you to buy a performance measurement system, either directly from a third-party vendor or on a monthly lease from the carrier that resells the system.

Standard SLAs may be the ticket

The good news is that as frame relay has matured, it has acquired several reliability characteristics that can be written into SLAs.

In fact, the Frame Relay Forum is writing definitions of the key elements that should be included in frame relay SLAs. Those factors include delay, mean time to repair, frame delivery ratio and mean time between failures.

The definitions are being written to help customers and carriers make sure they have a common language to speak when they are working out SLAs, according to Doug O'Leary, chairman of the Frame Relay Forum technical committee. That set of definitions is expected to be approved by the end of July, he says.

But currently users can obtain standard SLAs from MCI Communications Corp. and Sprint Corp. — and, shortly, AT&T — that include most or all of these factors. In fact, assuming AT&T finally tariffs its long-awaited frame relay SLAs, all three carriers will offer guarantees against network delay, or latency, across their nets (see graphic).

But experts caution that latency doesn't mean much to the end user unless the local loop is taken into acocunt. Here's where Sprint's frame relay service may have an advantage. It offers two flavors of permanent virtual circuits (PVC) — one for SNA and similar traffic and one for LAN-to-LAN interconnection. But to make the service really cook, users need a wideband local access

By David Rohde and Tim Greene

connection.

On SNA PVCs, Sprint provides a 55 msec delay guarantee only if you have a T-1 frame relay access line. The number jumps to 70 msec with a 256K bit/sec access line, and 115 msec with a 56K bit/sec access line. Sprint adds 15 msec across the board for LAN PVCs, though it charges slightly lower prices for those circuits.

Until recently, most carriers have only been willing to invoke network guarantees if you first open a trouble ticket to indicate that your service is slow or down altogether. The way around that is to purchase a network performance and reporting system, ideally one that matches a reporting system used by your carrier.

Caution: The actual hardware and software that measures the performance of the network comes

you just going to go with what the carrier says?"

Recently, Visual Networks teamed with Concord Communications, Inc. to integrate Visual UpTime with Concord's Network Health software, a reporting tool that gives network managers a view of how network devices are performing. That integration will give mangers a more complete view of how well their networks are doing.

The alliance was prompted by MCI and AT&T, both of which use Concord and Visual Networks gear in their frame relay service offerings. With Visual UpTime the carriers can offer customers views into their networks via Web-based servers. AT&T, for example, will charge users \$50 to \$200 per site, per month to integrate Visual UpTime into AT&T's frame relay service in a new offering called Frame Relay Plus (NW, May 25, page 8).

Viewing it on the Web

Such a service already is offered at a lower cost

by Intermedia Communications, Inc., a frame relay service provider based in Florida. Intermedia uses Sync Research, Inc. probes to gather data that is analyzed by Intermedia's ViewSPAN software. For \$15 per site, per month, customers can monitor their network and access reports from a ViewSPAN server.

For \$4,000 customers can get a ViewSPAN server license that lets them generate custom reports the carrier would not need. For example, a customer could generate a

report that details the activity of an accounting application on the network.

Intermedia has agreements to deliver services to customers over other carriers' networks in areas where Intermedia has no network of its own. ViewSPAN is being used by those partner carriers to monitor PVCs across the network interfaces. Negotiations are underway to give customers that same view, Intermedia officials said.

Eventually the cost of these monitoring and reporting systems may drop. Bruce Olson, vice president of service provider operations at Visual Networks, maintains that carriers stand to obtain a great cost advantage for themselves when they install enhanced DSUs on the customers' sites. That's because they can isolate and fix problems much quicker without dispatching technicians to run line monitors, probes and other test equipment.

"But what the carriers are struggling with is they're not sure yet how much they're going to save using this equipment," Olson says. "Until they figure that out, they need help from the customers in funding it."

LATENCY GUARANTEES TAKE CENTER STAGE

Carriers are building guarantees against network delay into their frame relay offerings. Below are the guaranteed maximum transit delays for the top three carriers:

60 msec*

Guarantee yet to be tariffed.

** Recently reduced from 70 msec.

60 msec**

* According to January announcement.

Frame Relay for LAN: 65 msec

Frame Relay for SNA:

50 msec

NOTE: Listed transit delays are generally one-way through the long-distance carrier's network only. Guarantees may require a minimum number of PVCs or other conditions.

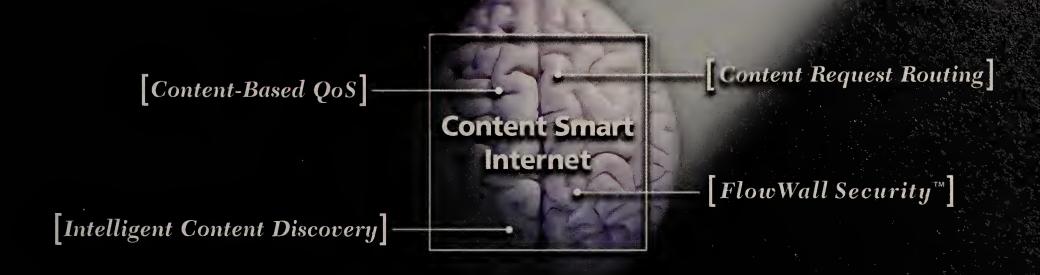
in various levels of sophistication, says Christopher Nicoll, senior research analyst with Current Analysis in Sterling, Va.

For example, Visual UpTime, the flagship product of Visual Networks, Inc. in Rockville, Md., uses a combination of hardware and software that not only measures overall traffic, but also measures what applications are using the network. That way the user can determine what application is causing congestion on a particular PVC. The user can then adjust bandwidth to alleviate the traffic jam or reschedule when certain applications are used to avoid excessive demand.

If you don't obtain an independent performance reporting system such as Visual UpTime, your SLA may be backed by nothing more than an impenetrable paper report from the carrier that, invariably, indicates that the carrier met the agreed-upon specifications.

"You have to take a look at who's reporting the service levels," says Matt O'Brien, senior manager for access planning at Splitrock Services, Inc., a network provider in Yorktown Heights, N.Y. "Are

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Briefs

Netscape Communications Corp. brought in \$127.2 million in revenue

this past quarter, but barely made a dime of profit. The break-even scenario (Netscape



reported a profit of \$8,000) was actually good news. Analysts had been expecting the company to report a loss.

Netscape brought in \$96.1 million in sales of enterprise software and services, and \$31.1 million from its Netcenter Web site (see story, this page).

■ Start-up NetDIVE, Inc. of San Francisco has released Web-based call center and customer service soft-

ware for corporate networks. CallSuite is a Java client/server system designed to let Web site visitors connect to company employees in real time. A visitor clicks on a paging button to set up the connection. Users can communicate using voice or text, and also can share documents, according to NetDIVE officials.

The product requires a Java-enabled browser. Call-Suite's server software runs on Windows NT and 95 and a number of Unix platforms. Pricing starts at \$999.

■ Transaction processing vendor BEA Systems has released a new version of its software that links back-end transaction systems to Internet applications.

The latest version of BEA
Jolt features support for
JavaBeans, which are reusable
code components for building
applications. BEA Jolt also supports HTML-based clients.

The product runs with BEA Systems' Tuxedo transaction processing server and is priced at \$3,000 per server.

Netscape strives for portal superiority

The company's Netcenter site has lost ground, but recent moves may change that.

By Andy Eddy

Mountain View, Calif.

Having been battered in the browser war and forced to give away its prized Navigator client for free, Netscape Communications Corp. has turned to new avenues for growth, namely enterprise software and its nowfor-profit Web site, dubbed Netcenter.

On April 22, Netscape announced an initiative to boost Netcenter, a 60-day process it named Project 60. But is the project a positive step to make the site a premier and lucrative "portal," or a grandiose yet desperate plan to keep visitors coming? So far the reports are mixed. In its report on April traffic, RelevantKnowledge, Inc., an Atlanta-based company that monitors Web usage, showed that the netscape.com domain held its position as the

second most visited site. However, the unique visitor count dropped to 21.1 million from March's 23.4 million. By contrast, during that same period America Online, Inc.'s aol.com domain jumped from 17.7 million to 19.3 million, and Microsoft Corp.'s microsoft. com domain rose from 18 million to 18.7 million.

Yahoo, Inc. recently became disappointed with Netcenter (the Yahoo search engine was accessible through Netcenter). Yahoo claimed that traffic generated by Netcenter had fallen by 50%, and the companies have dissolved their relationship.

Visitor relations

Many of Netscape's visits occur because the Netscape home page is the default in new browsers. However, the company claims to have more than 4.7

A WEB SITE KEY TO NETSCAPE'S FUTURE

Netcenter acts as an all-in-one information source offering search tools, discussion groups and messaging.



Java has key role in Microsoft-DOJ drama

By Chris Nerney

In filing its antitrust suit two weeks ago against Microsoft

Corp., the U.S. Department of Justice opened another legal front in the Java wars.

Sun Microsystems, Inc., which developed and licenses Java, hit Microsoft with a lawsuit last October. The suit alleged that Microsoft violated the Java licensing agreement it signed in 1996 by tampering with Java code, specifically

omitting two key components and altering Java class libraries, in its Internet Explorer 4.0 browser.

a statement issued after the antitrust suit was filed in U.S.

District Court in Washington, D.C., the company said,

McNealy: Strong words

oly," but no lawsuit.

about Microsoft "monop-

Last month, Sun announced a second court action designed to halt the shipment of Windows 98 unless it included a Java-compatible browser.

Sun's legal maneuvers are in response to an aggressive campaign by Microsoft to blunt the threat posed to its Windows operating system empire by Java. But do Microsoft's efforts to

splinter the Java platform for its

own benefit constitute monopolistic behavior?

The Justice Department apparently thinks so. Java was prominently featured in its 53-page antitrust lawsuit filed May 18, popping up as early as Page 3.

Sun also maintains that Microsoft has crossed the line into illegal, anticompetitive behavior. In

a statement issued after the antitrust suit was filed in U.S. District Court in Washington, D.C., the company said, "Microsoft's leveraging [of] its PC operating systems dominance into new markets by engaging in predatory pricing and exclusionary activities is against the law."

And Sun CEO Scott McNealy testified in March before a Senate committee that Micro-

soft's 85% market share in PC operating systems made it a monopoly.

Still, while strongly suggesting that Microsoft's Java efforts violated antitrust laws, the Justice Department's filing cites no anticompetitive action by Microsoft geared specifically toward Java.

For his part, McNealy said during his recent Senate testimony that despite suing Microsoft over licensing and trademark issues, Sun was not prepared to bring civil action over alleged monopolistic practices.

Sun officials and attorneys declined to comment on the government's case for this story, citing a protective order prohibiting the company from discussing evidence it has supplied

See Microsoft, page 46

Get more online:
Sun and Microsoft documents related to the court battles

WWW NWTISION COM

million registered Netcenter members in its seven months of existence. And since the inception of Project 60, Netscape has made some deals it believes will bolster the home page and

increase the number of visitors. These deals include: the addition of free e-mail in conjunction with Usa.Net; a search, content and advertising arrangement with Excite, Inc. that is expected to add at least \$70 million to Netscape's coffers; new agreements with other search providers, including Digital Equipment Corp.'s AltaVista, Infoseek Corp., LookSmart International, Ltd. and Lycos, Inc; and the recently announced Small Business Source, which offers content, services and tools from companies such as Concentric Network Corp., Amazon.com, Inc. and NewsEdge Corp.

Netscape promises more as Project 60 goes through its final 30 days, including offering personalization, which enables users to tailor the appearance and content that comes up when the site is launched. This feature is expected to be available by the end of July. While

See Netscape, page 46

Microsoft

Continued from page 45

antitrust investigators in the past year.

Some critics claim that Microsoft's efforts to quash Netscape's browser also are designed to limit the spread of standard Java Virtual Machines (JVM)

on which 100% pure Java applets and applications can run. (Microsoft has its own version of the JVM, which critics say doesn't work with all Java programs.)

"Once you have a JVM, the Java program will run on it regardless of the

underlying operating system, and probably the most efficient means of distributing JVMs is with a browser," said Kevin Arquit of the Washington law firm Rogers & Wells.

"I think the [Justice Department] is doing what it needs to do in the sense that it recognizes that access to Netscape is not just about the browser, it's also about distribution of the JVM so that Java is able to compete," said Arquit, who is the former head of the Federal Trade Commission's Bureau of Competition.

Further, he said, "Microsoft's internal documents establish its true motivation— to make sure there wouldn't be



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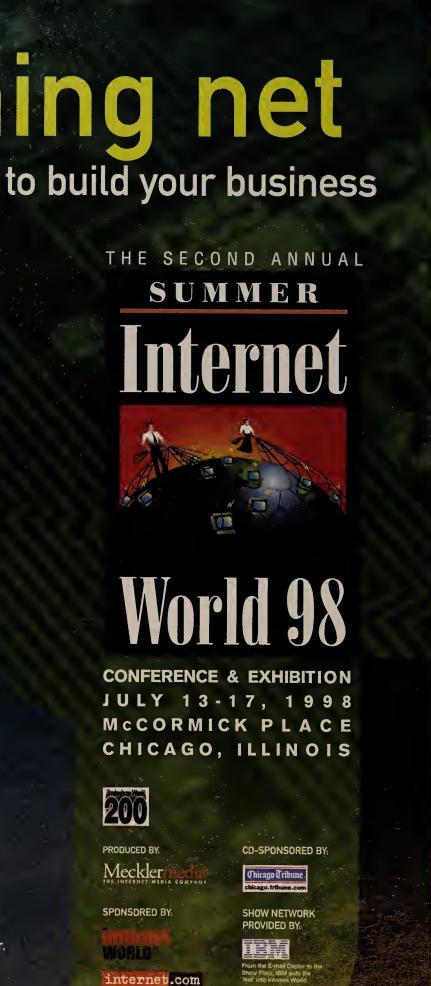
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Doing Java justice

The Justice Department's antitrust complaint against Microsoft contains several references to Java, including:

"In a June 20, 1996, memo, Microsoft Group Vice President Paul Maritz explained that... it was necessary 'to fundamentally blunt Java momentum' (momentum supported by cross-platform browsers) to 'protect our core asset Windows — the thing we get paid \$'s for.'"

- From Page 45

any competition." (See graphic, below.)
One user said he suspects the Justice
Department has a strong case regarding
Java "based on other things Microsoft
has done, even before this came up."

Antone Ritter, an intranet development engineer at Computer Sciences Corp.'s Fort Worth, Texas, office, said, "Microsoft doesn't want anything out there but Windows."

Netscape

Continued from page 45

Netscape is mum on other offerings it will implement, the expansion of Netcenter's channels may include such features as financial services and online banking.

"The channels will offer compelling content [and] compelling services as well. The ultimate goal is to offer a breadth of services so people come to our site during the day for consumer and business tasks," a Netscape spokeswoman said.

Some analysts, who were skeptical of Netscape's survival after its January announcement of losses in last year's fourth quarter, are changing their opinions. In fact, Netscape posted a small profit for its latest quarter. Tim Sloane, director of Internet research for Aberdeen Group, a consultancy in Boston, said a positive for Netscape is that Netcenter enables users to "streamline their business to stay in touch with the world in general."

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'NET INSIDER

Road warrior connectivity

Getting to 100,000 miles on United Airlines by July, as it looks like will happen, should indicate something—too much of that is spam).

know I travel far too much. is wrong with my priorities. But, for many reasons, the travel continues.

I also get far too much e-mail (and far

The combination of my travel and e-mail excesses means that I spend long hours online from hotel rooms. Somehow the glamour of this lifestyle has eluded me so far.

At least there is now some potential for things to get better. Internet access in hotels and airports has become more common, but there are still some rather basic problems. Strangely enough, the systems themselves seem to have been designed by people who do not actually use the Internet. The features of the inroom, TV-based systems are strange at best and marginally useful as a norm. And it must have taken quite a bit of research to come up with a keyboard as bad as the model found at so many of the Internet carrels at airports.

Business hotels are beginning to get a clue about the need for connectivity, but most still need lots of help. Just having a second phone line that can be used to dial out is a good start. At least you do not get cut off when the hotel's call waiting signal comes on. But it would help if the data jack were on a phone near a desk suitable for laptop use.

It would also help if there was a power outlet within 30 feet of the data jack that would not get switched off when you turn out the room lights.

What I would really like to see is more Ethernet-Internet based access in hotel rooms. With this technology, there would be no need for special interfaces or drivers. If Scott Bradner the hotel has a



reasonably fast connection to a decent ISP, then the performance can be quite good using an Ethernet-based system. But there can be significant configuration changes required when plugging into someone else's LAN. The image of the average traveling executive trying to reconfigure his laptop is amusing as long as you're not the one running the help desk back at the executive's office.

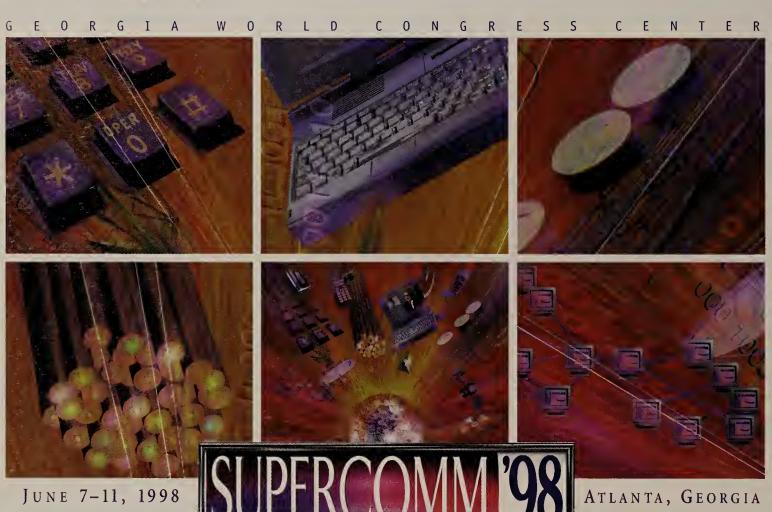
I saw a neat service offering the other day from Elastic Networks that could alleviate some of these problems. It is designed to work in hotel rooms and other places where many people may want to plug in. The offering listens to the Ethernet traffic and configures itself to do address translation so that your laptop works without any reconfiguration. I was even able to use the secure shell from my laptop Macintosh back to the computer in my office just by running the secure shell.

I expect you might run into problems with Elastic Networks' offering if you were trying to access sites protected by certain external firewalls. But since we do not have an external firewall at Harvard, I'd change hotels if I could get this service in my room.

Disclaimer: Harvard hardly ever travels, so the above observations and wishes must be mine.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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Technology Update

Covering: Evolving Technologies and Standards

NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to rnutter@world.std.com.

We have been running Novell's NetWare/IP for several months without a problem, but now we need to change our IP addressing scheme because of a corporate MIS directive. MIS wants us to use a uniform subnet mask and assigned IP address ranges based on office location. We have to reconfigure NetWare/IP but minimize the downtime. Do we have to reInstall NetWare/IP after reconfiguring it?

VIa the Internet

You won't have to reinstall Net-Ware/IP totally, but you will encounter some downtime. The first step is to use INETCFG.NLM to change the server 1P addressing to the new scheme outlined by your corporate MIS folks.

After completing this and using the Reinitialize System command at the Server: prompt, use the Unicon utility to change Net-Ware/IP's configuration.

After stopping the NetWare/1P, Domain Name System (DNS) and Document and Security Server (DSS) services, change the IP address listed in the server profile. Under the Manage Services option, change the 1P address of the primary NetWare/IP number. Restart the DNS, DSS and Net-Ware/IP services in the order 1 mentioned.

Next, toggle to the Product Kernel and Server Console screens to watch for successful start messages from DNS and NetWare/IP services. Check the DNS services listing in Unicon to make sure it has acknowledged the changes. Once everything appears to be OK, proceed with making the changes to secondary NetWare/IP servers.

If you are using Dynamic Host Configuration Protocol (DHCP) on the network, you also should change the IP address range and the NetWare/IP information assigned by the servers.

New ATM service targets IP networks

By Sergio Catanzariti

ATM is getting a new class of service tailored specifically for IP backbone nets. The guaranteed frame rate (GFR) class of service will support frame-based traffic — both IP and Ethernet — better than ATM's current best-effort services do.

GFR is being jointly developed by the ATM Forum and the Telecommunications Union-Telecommunications. If all goes as planned, large enterprises and carriers will see GFR products next year.

GFR will be ATM's sixth class of service and the first new traffic specification to emerge since the ATM Forum's Anchorage Accord of 1996. The Anchorage Accord froze the development of new standards for two years.

At the heart of the Accord was the decision to group standards into foundation-layer specifications and extensions that will be built on top of those specifications. Foundation-level components included the Physical Layer specification, Traffic Management Signaling 4.0 and Private Network-to-Network Interface Extensions included specifications such as Multi-Protocol over ATM and LAN Emulation 1.0.

GFR falls under the auspices of Traffic Management. GFR will optimize the handling of packet-based LAN traffic that otherwise relies on unspecified bit rate (UBR) service across ATM backbones.

Today's UBR is a best-effort service, similar to frame relay's zero committed information rate (0-CIR). UBR carries IP or other traffic coming off an Ethernet LAN when network bandwidth happens to be available. UBR was developed three years ago as a way to accommodate legacy LANs in the early ATM market.

Available bit rate (ABR) is another ATM service meant to provide a greater measure of guaranteed packet performance over ATM backbones. But ABR remains difficult to implement between routers in an ATM network and is not considered a ATM backbone. practical service option.

Better packet service is imperative because today's ATM requirements are focused more on IP traffic than they were when UBR and ABR arrived. ATM is being used in large enterprise, carrier and ISP networks to consolidate and extend IP services over the wide area. ATM brings scalability and greater flexibility to the IP core, and its importance will increase as new IP services (including packet voice and video) roll out.

GFR is being developed to

Ideally, GFR could be implemented as a software upgrade to existing ATM edge devices. But it may be that GFR entails new conformance algorithms requiring hardware upgrades.

These input algorithms, which express ATM's classes of service, are implemented where traffic enters a switch. They keep tabs on the incoming traffic and will only admit cells that conform to the traffic profiles established for each circuit.

But ATM performance hinges more on the output side

technology for ATM's IP backbone role. Adaptive-discard is particularly well-suited to GFR's requirements.

Adaptive-discard refers to dynamic, two-dimensional traffic algorithms that can adapt to the changing fairness of network conditions. The technology reacts not just to bandwidth availability and burstiness, but to the fair allocation of throughput and buffering among competing traffic streams.

In comparison, per-VC management is defined by static thresholds that do not respond

GFR software on a local switch will

HOW IT WORKS

Guaranteed frame rate

GFR will be the sixth ATM class of service defined by the ATM Forum. The idea behind GFR is to provide a simpler, higher performing technique for getting IP traffic across an ATM backbone. GFR is designed to be more effective at handling IP traffic than the current ABR and UBR standards, according to its creators.

recognize incoming IP traffic and add a GFR header to the IP packets. The switch will then use GFR to set up a virtual pipe across the ATM backbone IP traffic from the LAN to ensure the IP traffic's delivery. hits the switch. Switch IP LAN The receiving switch, which will also be running GFR software,

will strip off the GFR header and pass the IP packets on to their

provide the exact quality of service required by all types of IP traffic. The intent is that GFR should become the enabling ATM class of service (CoS) for IP's backbone growth.

Applying to both Layer 2 and Layer 3 protocols (Ethernet and IP), GFR will provide throughput guarantees at the frame/packet level and will deal more fairly with such traffic at the ATM level when congestion occurs.

The technical challenge is to find a better way of not dropping packet-based traffic. Designers plan to support three levels of GFR conformance, with fairness rather than priority being the key. GFR will help to achieve better traffic shaping and fairness among competing IP traffic streams in a crowded

of a switch, where throughput is measured.

For example, ATM traffic management and congestion control happen on switch output so that if there's congestion in the network ahead, traffic is buffered before it leaves the

In other words, GFR alone is not enough to ease IP traffic through an ATM backbone. GFR will define a better CoS for IP handling, but to succeed GFR will require the best traffic management that ATM switch vendors have to offer. It does no good to let IP traffic into a switch more efficiently if the traffic cannot be managed fairly on the way out.

The more recently developed adaptive-discard approach to traffic management is a better as amenably to bursty traffic. Adaptive-discard gives ATM greater flexibility for GFR to work with, especially at the WAN edge where flow control and fairness affect network performance.

The GFR CoS will grant more distinction to IP streams being carried in an ATM network. The specification is being written to allow more fairness in the way packet-based traffic is handled. Enhanced ATM traffic management based on adaptive-discard will be the factor on which GFR thrives.

Catanzariti is manager of technology planning at Network Equipment Technologies, Inc., a network hardware vendor in Redwood City, Calif. He can be reached at sergio_ catanzariti@net.com.



EDITORIAL in sights

Say it simple, stupid

ou've heard about the high-tech labor shortage? Well, it isn't nearly as severe as the shortage of high-tech clarity. I'm exhausted from trying to figure out what vendors are talking about these days. They're leveraging platforms, refocusing on core competencies, building scalable switching fabrics, extending their business models, yada, yada, yada. But I'm darned if I know whether they're selling software or hardware, repositioning previously announced products or talking up yet another in a string of meaningless "strategic" partnerships.

As a journalist, I get paid to get vendors to clarify their strategies and to explain their products. It's not unusual for me, after listening for some extended period of time, to look into the eyes of the product manager or the marketing vice president and say: "I don't get it. Do you mean . . . (fill in the blank)." At this point, I try to summarize what I think the vendor is talking about. Fairly often I'm wrong, and another round of vendor-speak ensues before I can narrow things down.

Now painful as this is, I have the time to do it. It's my job. But what about network managers who have real work to do, who have networks to run and budgets to manage?

In a cluttered market, the secret to success is clarity, not amass-

ing a bigger store of multisyllabic catch phrases and buzzwords. Don't look to your PR agencies and your marketing gurus for yet more verbiage to wrap around your already bloated messages. Cut back. Strive for simplicity. Do more with less.

In short, embrace this quaint variation on the oft-cited Keep It Simple, Stupid (KISS) philosophy: Say It Simple, Stupid.

Take this test: Can you explain in two non-run-on sentences what your product does and why anyone should care about it? Would your significant other — the one who doesn't work in networking — know what you are talking about?

If not, go back to your office and work on it. If you want to stand out, stand down from all the blather. Focus, not quantity, makes the message. It will help you win over the consultants, the journalists and — most important — those busy customers.

Readers, send me your worst examples of vendor hyperbabble. I'll publish them in an upcoming column. Also, I'm still looking for comments from Bell Atlantic customers on life after the NYNEX merger. Drop me an e-mail, or join our conference on Network World Fusion (www.nwfusion.com).

John Gallant, editor in chief

jgallant@nww.com

Intranet applications • Dale Dowdie

The gospel according to IBM: Salvation through e-business

arlier this year, IBM found religion in the form of electronic commerce. CEO Lou Gerstner had a vision of an information superhighway lined with electronic stores and shopping malls, all running on IBM hardware and software.

A few years ago, Microsoft also became a convert to the power of the Internet. In less than three years, Bill Gates and company have not only embraced Internet technology but have taken a dominant role in almost every segment of the Internet, from browser to server to vertical-market services to electronic commerce. IBM is hoping to achieve similar results with its electronic business (e-business) strategy, which incorporates electronic commerce and business-to-business extranets.

Gerstner may very well be correct about e-business' potential. What remains to be seen is whether an organization of IBM's size and complexity will be able to react with the speed necessary to establish and maintain a lead in this area.

IBM already has a strong foothold in e-business via its partnership in the Integrion Financial Network, which provides interactive banking and electronic commerce services to financial institutions. IBM also sells custom e-business applications for the retail, insurance, health care and financial industries. And, of course, IBM has dedicated a significant number of its service personnel to the integration and support of these platforms.

However, IBM's biggest push into the e-business sector will come from two recently upgraded products: Net.Commerce Pro and Domino.Merchant Server 2.0.

The packages target different segments of the market. Net.Commerce Pro is for large electronic commerce sites with complex cataloging and process methodologies. Domino.Merchant, which was developed by Lotus, targets small to mid-size businesses that are Notes users.

Both products reflect the strengths and weaknesses of their developers. Net.Commerce Pro provides support for multiple servers, databases and storefronts on a single server, as well as comprehensive Javabased administrative tools and integration into many operating system platforms. However, it does not provide much in terms of wizards — automated processes that simplify the installation and configuration of e-business software. Net.Commerce Pro does include some complex business-to-business tools for extending relationships to vendors

and business partners via secure extranets.

Domino.Merchant 2.0 does not support as broad a range of databases and operating systems as Net.Commerce Pro does. But it is user friendly, easy to install and no longer requires the Notes client to create a storefront. With the new browser-based administrative tools and wizards, you can develop a fully functional electronic commerce site in a few hours.

The products take advantage of Web-based administration, allowing you to make changes to your electronic commerce site using any Web browser. Both also include support for the Secure Electronic Transaction and Secure Sockets Layer protocols. Domino.Merchant 2.0 lists at \$3,995, and

Net.Commerce Pro starts at around \$19,000.

The sleeping Blue Giant seems to have woken. If these products are any indication of IBM's ability to make quick changes in response to customer needs in the e-business arena, competitors beware.

If you are looking for an electronic commerce solution from a company that provides all of the pieces of the pie, you may want to take another look at IBM. Big Blue has the resources, stability and capacity to make a big splash in this arena. And if IBM continues to expand on the strengths of Domino.Merchant 2.0 and Net.Commerce Pro in future e-business offerings, it may well become the one-stop electronic commerce shop for companies of all sizes and business models.

Dowdie is president and CEO of Intellitech Consulting Enterprises, Inc., a Mass.-based technology consulting and systems integration company. He can be reached at ddowdie@intellitech.net.



Send letters to nunews@nuw.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification

Dubious achievement

Your article "Using 'body language' to secure networks" (May 4, page 57) reports that the International Computer Security Association (ICSA) gave six biometric products its stamp of approval.

The story further states that the ICSA performs "independent evaluations," leading the reader to believe that the ICSA is an objective research body. In reality, ICSA is a for-profit organization that gathers a group of vendors into a technology-defined "consortium" and then negotiates a series of lowest common denominator stan-

Dear Novell: Beef up your marketing

A

n open letter to Eric Schmidt, chairman and CEO of Novell, and John Slitz, Novell's senior vice president of corporate marketing:

Dear Eric and John,

Your company has seen many trials and tribulations over the past few years. It's got to be tough on any company to change top executives and product strategies as often as Novell has. And with the Bad Boys from Redmond breathing down your necks, it's understandable that your company has had a few missteps along the way.

Since you took the helm last year, Eric, Novell seems to be on solid ground. You've recommitted yourselves to the networking business and staked a healthy

claim in the e-mail and Internet markets. Perhaps most promising is your product line for directory services, a vital component for any enterprise network. Even your archrival Microsoft is giving you enough time to grab significant market share for directory services in the Windows NT space before Microsoft attacks with Active Directory and NT 5.0. What more could you ask for?

Well, there is still a bit of work ahead for you. I've addressed this letter to you, too, John, because many of your loyal followers believe that marketing, not technology, is Novell's biggest shortcoming. If you don't believe me, perhaps you'll believe about 170 dedicated network managers who dared to dispute that NetWare is destined for oblivion.

One of the open forums currently running on the Network World Fusion online site (www.nwfusion.com) is about NetWare's prospects for survival. This forum is a must-read for everyone at Novell. The editors of *Network World* posed the following questions: Is NetWare destined to follow other network operating systems (NOS) into oblivion? Or is the new Novell going to kick Microsoft back to Redmond?

The last time I tuned in to this forum, there were 168 responses. What a great collection of free market research for you! Having read through most of the postings and estimating that 90% of them were in Novell's favor, I'd say that Novell has quite a loyal following. What's more, while many of these techies are passionate about their commitment to Novell, they are almost equally as passionate in their disdain for Microsoft. ("No one who has actually worked closely with NetWare and NT would ever recommend NT over NetWare as a main OS," one respondent asserted.)

This begs the question, if the knowledgeable technical experts prefer Novell's networking products and strategies to Microsoft's, why are they purchasing and implementing Windows NT as an NOS? The answer is marketing.

Novell does a fine job of marketing its

products to the techies. But the techies don't need to be sold; they are already in Novell's camp. Where you need to spend your marketing dollars, John, is with the corporate executives and high-level decision makers. ("The decision to switch to an NT house almost always comes from upper management because they read some article or saw some commercial saying NT does this or NT does that," another forum respondent contended.)

We're also concerned that you don't devote enough resources to courting the independent software vendors (ISV) and hardware vendors (IHV) that provide a push for

your products. One of the reasons Windows NT has been able to make inroads in the NOS space is that there are plenty of ISVs that are creating products to fill the gaps left by Microsoft.

Microsoft spends megabucks every year to encourage ISVs to put their limited resources in Redmond's camp. That's not to say that Microsoft has better programs for developers than Novell does: You both offer the products, training and tools to help ISVs make a living off your respective environments. But somehow, Microsoft has played the numbers game to show ISVs that they have more opportunity by partnering with Microsoft than with Novell.

The numbers game plays well with IHVs, too. Companies such as Digital and Compaq want to sell more high-end servers. Because it's a resource hog, Windows NT helps them do that. Perhaps NetWare has been too resource-efficient for its own good. But NetWare still appeals to the masses, which means high volumes of servers, much to the IHVs' delight. How about stepping up the marketing on the basis of overall network stability?

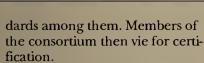
Eric and John, you also would do well to heed the warnings of a few concerned customers who are worried that great technology isn't enough. Banyan and Apple thought the same thing, and look where it got them.

We're behind you, guys. No one (except perhaps Microsoft) wants to see Novell go away. We're encouraged by your current direction. One forum respondent summed it up well: "Novell has turned the corner. Schmidt has the right vision and the right apps. All Novell really needs is a little more marketing savvy."

Sincerely,

Linda Musthaler and 168 of your closest friends

Musthaler is vice president of Currid & Co., a Houston-based technology consulting firm. She can be reached at linda@currid.com.



In this light, the "boost" reportedly given to the six products is really not much different from a parent praising his or her children for doing a set of chores that the parent and the children have previously defined and agreed upon.

Kevin Anderson Cambridge, Mass.

Bygones, shmygones

Your editorial "Let bygones be bygones" (May 11, page 44) implies that if a company can get away with an illegal activity for a sufficiently long period, the activity should be forgiven or ignored. If this is the response to wrongdoing, what incentive is there for companies to obey the law?

You say that the government has missed the boat, that since Windows 98, with its integrated Internet Explorer is just around the corner, antitrust action is moot because

Microsoft will no longer be dumping the browser on the market to quash competition. In fact, the increased level of integration between the browser and Windows is dumping taken to its logical extreme. If Microsoft has been acting illegally to the detriment of other companies, the fact that the government has been slow to respond does not mitigate the harm that has been done to those companies.

Rather than being bad for the country, appropriate government action now will define the business tactics that firms will be able to use in the future. Without a watchdog to ensure fair play, what will our software options be in 10 years? Microsoft is branching out into other markets: communications, cable television and

entertainment. Though it has stumbled at these efforts thus far, remember that early versions of Windows stumbled, too.

If companies are able to control content by owning the infrastructure, the future may offer fewer options in more areas than we can imagine today. The time to address these issues is before Windows 98 is released.

Mike Palandri

Mike Palandri Business systems support specialist Eugene School District 4J Eugene, Ore.

Roughing it

Regarding Mark Gibbs' column "In the woods without electronic mail" (May 11, page 70):

I'm getting ready to visit the Grand Canyon. All in all, I'll be gone for four and a half days and will enjoy not having e-mail. I look forward to enjoying nature, letting my crew back home solve the problems they need to solve, reading a few books and just walking around.

Gibbs is too tied to e-mail. Before e-mail, did he forward his snail mail to the campsite and his phone to the ranger station?

Gibbs needs to learn to relax and let go. The world will still turn while he is unattached.

John Trinkaus

Director of IS

Redlands Community Hospital

Redlands, Calif.

Teletoons

·Future of the Internet.

The U.S. Supreme Court allows ISPs to apply more severe legal remedies against junk e-mailers.



il Frank and Joe Troise ba

Letters

Letters

Letters about roughing it and other topics





The smart definition of a complete VPN

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Enterprise Management

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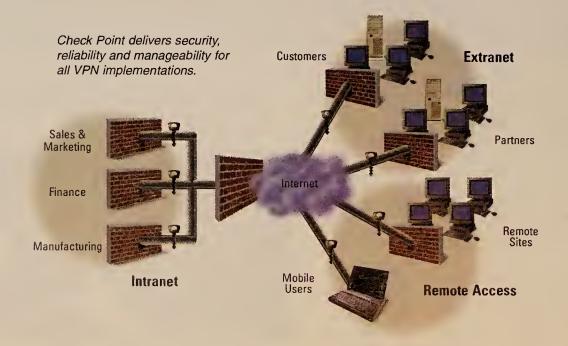
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More firewalls, better features

Vendors fan out with new products and enhanced functions, but Check Point Software's FireWall-1 still tops the pile.

ears have their cave, gophers have their hole — and you have your network. It's a comfortable place, as long as it's safe. It's up to you to create that zone of sanity for your users, and the first line of defense is the firewall.

Fortunately, you have lots of options. In the Review below, we look at eight products that guard your network. Check Point Software Technologies, Ltd.'s

FireWall-1, the market-share leader, also led the field in our lab. But a couple of newcomers are making the market more interesting.

In fact, this market is one of the liveliest in the networking arena. Our Issues and Trends story on page 57 highlights some of the developments in firewall technology since our last Buyer's Guide, and puts some of the emerging standards in perspective.

ology since our last Buyer's also find an Interaction of the Guide, and puts some of the merging standards in perspective. The sheer number of firewall criteria you select.

products is apparent from the size of the Buyer's Guide Chart on page 58, which features 35 products in all. In fact, we gathered so much information, we couldn't fit it all in print, but you can find it in an expanded online table on Network World Fusion at www.nwfusion.com. There you'll also find an Interactive Buyer's Guide, which lets you find the firewalls that meet the buying criteria you select.

By Joel Snyder



We've all learned to be skeptical when confronted with anything billed "new and improved," but those two words best describe the developments in the firewall market-place. New and improved features include the following:

• Management interfaces that

make safe configuration and monitoring easier than ever.

• Intelligent proxies for implementing virus scanning, URL blocking and Java filtering.

• User authentication for remote users that provides more secure and less intrusive access to corporate

resources.

• Security roadblocks to prevent protocol-based attacks, such as the Ping of Death and TCP SYN floods.

On top of all this, firewall vendors are integrating into their products network edge functions, such as Web page caching, virtual private net-

NetworkWork Blue	Configuration and management (25%)	Flexibility and advanced features (25%)	Reporting/alerting/ monitoring (25%)	General capabilities (15%)	Platforms supported (5%)	Documentation and online help (5%)	Tota
Check Point Ribbin	8 x .25 = 2.00	8 x .25 = 2.00	$6 \times .25 = 1.50$	8 x .15 = 1.20	$8 \times .05 = 0.40$	8 x .05 = 0.40	7.50
CyberGuard	7 x .25 = 1.75	8 x .25 = 2.00	$6 \times .25 = 1.50$	7 x .15 = 1.05	5 x .05 = 0.25	$8 \times .05 = 0.40$	6.95
Watchguard	7 x .25 = 1.75	7 x .25 = 1.75	7 x .25 = 1.75	$6 \times .15 = 0.90$	5 x .05 = 0.25	8 x .05 = 0.40	6.80
NetGuard	6 x .25 = 1.50	7 x .25 = 1.75	8 x .25 = 2.00	5 x .15 = 0.75	5 x .05 = 0.25	6x.05 = 0.30	6.55
Microsoft	5 x .25 = 1.25	6 x .25 = 1.50	7 x .25 = 1.75	7 x .15 = 1.05	$5 \times .05 = 0.25$	8 x .05 = 0.40	6.20
Cisco	7 x .25 = 1.75	7 x .25 = 1.75	5 x .25 = 1.25	5 x .15 = 0.75	5 x .05 = 0.25	8x .05 = 0.40	6.15
Ukiah	6 x .25 = 1.50	5 x .25 = 1.25	6 x .25 = 1.50	8 x .15 = 1.20	$5 \times .05 = 0.25$	5 x .05 = 0.25	5.95
Elron	$6 \times .25 = 1.50$	6 x .25 = 1.50	4 x .25 = 1.00	5 x .15 = 0.75	$5 \times .05 = 0.25$	$7 \times .05 = 0.35$	5.35

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works and bandwidth management.

We invited more than a dozen vendors into our lab for testing as part of this Buyer's Guide to firewalls. Eight accepted, and of those, we found two that stood out. Check Point Software's FireWall-1 won our Blue Ribbon on the strength of its sheer breadth of features that make it a good fit in diverse enterprise networks. CyberGuard Corp.'s CyberGuard Firewall, free of its former proprietary hardware platform, is also very impressive. It has most of the features of FireWall-1, plus a variety of security features built into its operating system that should suit people who are as worried about internal security as they are about external security.

Also praiseworthy is Cisco Systems, Inc.'s PIX, which has a robust simplicity that should be attractive to network managers who want to control access and need little else.

Meanwhile, a couple of newcomers have strong entries. Watchguard Technologies, Inc.'s Watchguard Security System and NetGuard, Inc.'s Guardian both are worth evaluating. Each goes beyond our top-rated choices in one or two ways. Though slightly immature, they have the potential to be strong competitors.

Ukiah Software, Inc.'s NetRoad FireWALL for Windows NT, Elron Software, Inc.'s Elron Firewall/ Secure 32OS and Microsoft Corp.'s Proxy Server (which the company touts as a firewall) all had strong points, particularly for small networks, but enterprise-minded network managers may find them too limiting and inflexible.

Configuration counts

Getting started with a firewall requires an intuitive configuration utility. Without one, you may be inclined to put off the inevitably necessary configuration changes. While early firewalls were a pastiche of tools and utilities, a common goal of vendors today is a single unified

interface that provides a clean window into the health, status and configuration of the firewall. The best products take into account the fact that the firewall interface is used infrequently, meaning online documentation and assistance is vital.

One of the first vendors to build an easy-to-use configuration utility was Check Point, in its FireWall-1. The interface helped catapult the product into market leadership. The FireWall-1 interface, with its source and destination orientation and simple top-down ordering, fits well with the way network managers view their networks.

Although the FireWall-1 interface continues to be easy to use, Check Point has added so many features it has stretched its original interface paradigm beyond its limits. We were told a graphical user interface (GUI) face lift will be included in a version to be released shortly; that's good it's overdue. Some properties windows, for example, have eight or

nine tabs, making them cumbersome. Still, the product is easy to configure.

Products such as Ukiah Software's NetRoad and NetGuard's Guardian, with the same style of interface, are likewise easy to configure. In fact, they're easier because they don't do as much as FireWall-1 and, therefore, don't test the limits of user interface design.

Manage remotely

Remote management has become commonplace. Generally, remote management involves a client application on a workstation communicating over an encrypted link to the firewall. Some firewalls, such as Cisco's PIX, Elron Software's Elron Firewall and Watchguard Technologies' Watchguard Security System, require a second system for configuration and management. Of the products we tested, only Ukiah Software's NetRoad FireWALL has no support for remote management.

FireWall-1 offers simultaneous management of an entire network of firewalls from one Windows or Unix management station. Although other vendors, including Microsoft, CyberGuard and NetGuard, allow one management console to control multiple firewalls, none uses the integrated "one policy for all" approach that FireWall-1 offers. With FireWall-1's management interface, one network security policy controls firewalls and any routers that implement security through access rules and filters. Rules are applied throughout the network with pieces of the policy set wherever appropriate. This approach means security policies common to all firewalls need be entered, managed and edited only once. Other vendors require you to maintain each firewall policy separately, significantly increasing the burden and fostering configuration errors.

Elron Software's Elron Firewall takes a slightly different approach in its user interface, focusing on services rather than systems. Servicebased configurations base their rules on applications: Is Domain Name System let through? How about telnet? System- or address-based configurations reverse the process: What can this or that address do? In a homogeneous network, the servicebased approach is even simpler than the system-oriented one used by Check Point, Ukiah Software and NetGuard. We found Elron Firewall the easiest to configure, but only for simple configurations. More complex environments, particularly ones in which systems do not have similar attributes, can be immensely difficult

FireWall-1 3.0

Check Point Software Technologies, Ltd. www.checkpoint.com

\$2,995 to \$18,990

CyberGuard Firewall Release 4 CyberGuard Corp. www.cyberguard.com \$5,995 to \$14,995

- ▲ Easy to configure and reconfigure
- ▲ Wide range of platforms; best multisite management
- ▲ Broad range of features
- ▲ Good real-time monitoring tools ▲ Built-in split Domain Name System
- ▲ Strong proxy list
- ▼ Primitive logging features

Weak monitoring tools and

real-time features

CONS

▼ Configuration interface could be smoother

▼ User interface has become unwieldy

Watchguard Security System

Watchguard Technologies, Inc. www.watchguard.com \$3,995

- ▲ Flexible configuration
- ▲ Good real-time avoidance features
- Constrained configuration may be unable to grow as needed
- Internal Linux kernel puts operating system support burden on small vendor

Guardian 3.0

NetGuard, Inc. www.ntguard.com \$3,980 to \$8,980

- ▲ Excellent real-time connection monitoring
- ▲ Good configuration wizard for simple networks
- ▼ Limited proxies
- Inadequate documentation

Proxy Server 2.0

Microsoft Corp. www.microsoft.com/proxy \$995

- ▲ Tight integration in an all-Windows NT network
- ▲ High-end HTTP proxy features
- ▼ Some features inaccessible to non-Windows clients
- Requires client registration in NT user database for authentication

PIX Firewail 4.1

Cisco Systems, Inc. www.cisco.com \$9,000

- ▲ Simple security model is easy to configure
- ▲ Command-line interface will be familiar to Cisco router technicians
- Limited proxy support
- ▼ Fairly inflexible security model

NetRoad FireWALL for Windows NT 2.0

Ukiah Software, Inc. www.ukiahsoft.com \$995 and up

- Quick setup; includes IPX-to-IP
- gateway ▲ Low cost

- Poor documentation
- ▼ Inflexible built-in configuration rules

Eron Firewall/Secure 320S

Elron Software, Inc. www.elronsoftware.com \$4,995 and up

- ▲ Quick configuration for simple networks
- ▼ No real proxies
- Authentication requires additional Windows application

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to construct. Those environments can be even harder to maintain because the detailed part of the configuration is buried several layers deep.

Cisco's PIX continues to be largely command-line driven, an iconoclast in a world of GUIs. Although Cisco has made available a Java-based GUI, it is slightly more difficult to use and understand than the command-line interface. While we don't mind the familiar Cisco-style command line, we're still waiting for Cisco to develop a GUI that frees the network manager from having to learn a command-line interface.

Still, the PIX, with only about 20 configuration commands available, is elegant and sparsely simple. Most configurations can be displayed on no more than one screen, and the commands are intuitive enough that they can be learned quickly.

Further down in the GUI hole is Microsoft's Proxy Server. Although configuration is exposed via a number of interfaces — the Microsoft Management Console (MMC), a Web browser or even a DOS command line — this first version with firewall capabilities needs some shaking out. That's because Microsoft insists on having the GUI fit its MMC, rather than matching management to the needs of network managers.

Although Microsoft's product is capable, with Web caching, protocol translation, firewall and SOCKS capabilities built in, the configuration interface is more complex than it has to be and often depends on subtle terminology to differentiate related functions.

Watchguard Technologies' Watchguard Security System has an innovative configuration approach. Although it has a service-oriented configuration similar to that of Elron Software's Elron Firewall, Watchguard has done a better job at parceling out configuration tasks

Turn to Network World Fusion for:

- A companion story on authentication methods
- A Web resources page
- A Usenet discussion group
- Yahoo's list of firewall products

and issues. For example, the software allows you to create a separate list of "always blocked" TCP ports that sits as a complement to (and overrides) the service-oriented rule base. Considering the extreme flexibility of the product, we were surprised at

how quickly and easily we were able to become power users.

Watchguard Security System and Cisco's PIX impressed us by making us feel more in control of the product with little training — an important plus when you consider you might only adjust your firewall configuration once every two or three weeks.

Security strategy

The maturation of the firewall market has been accompanied by a further development in security strategies. While early firewalls picked one strategy — network level (packet-based), transport level or application level — the successful firewalls we saw combined these strategies to the benefit of network security. High-end products also have added features such as protocol-based attack detection and real-time break-in avoidance.

In the meantime, support for the SOCKS authentication and proxy system has largely fallen by the wayside, with only CyberGuard and Microsoft supporting the protocol.

We focused on security strategies from two angles: the rules you can use to block or allow traffic, and the proxies that can make more intelligent decisions. Proxies intercept traffic at the application layer and understand the application protocol, which allows them to filter or modify traffic based on application issues rather than simply by IP address or authenticated user. Proxies, for example, can stop ActiveX applets from being loaded from Web pages or allow internal users to fetch files via File Transfer Protocol (FTP) but not push them outside of the firewall. But we found most vendors overstated their product's proxy capabilities.

Proxies range from the barely functional (such as the FTP proxies from Elron Software and Cisco) to the massively complex, such as the HTTP proxy provided by Microsoft. The strongest proxy collections come in Check Point's FireWall-1 and CyberGuard's CyberGuard Firewall. Ukiah Software's NetRoad FireWALL and Watchguard Technologies' Watchguard Security System sit on a second tier. For example, the well-designed FTP proxy in Ukiah's NetRoad FireWALL lets you enable or disable particular FTP commands and gives you the power to block certain file types from passing through the firewall.

Proxy power for HTTP reaches its peak in Microsoft's Proxy Server, which, after all, was originally nothing more than an HTTP proxy.

Microsoft's server not only controls

How We Did It

We set up each firewall with three different security policies to see how flexible and capable they were. For each policy, we spot-checked to see if firewalls stopped unauthorized traffic and logged sessions and break-in attempts. All of these products except for Microsoft's and Ukiah's have been certified by the International Computer Security Association, so we didn't duplicate that organization's extensive security attacks.

Our hardware platform for testing most firewalls was a Pentium-based 200MHz system with 128M bytes of memory running Windows NT 4 with Service Pack 3. In some cases, vendors provided a hardware/software bundle for testing.

and remaps URLs, it also caches Web pages to speed access to Internetbased data. Check Point, CyberGuard, Ukiah Software and Watch-guard Technologies provide respectable and useful HTTP proxies with virus checking and URL blocking — but no caching. Check Point's FireWall-1 and Watchguard Technologies' Watchguard Security System are especially smart, with automatic linking to external HTTP caching servers. Microsoft, Check Point and CyberGuard all also provide load balancing for incoming HTTP services, with Check Point providing the most sophisticated options. (Cisco offers load balancing in a separate product line.)

None of the products we tested has a Simple Mail Transfer Protocol (SMTP) proxy worth using, though FireWall-1's ability to spoof the true sending IP address when forwarding stored e-mail is a clever innovation. Fortunately, we were able to disable the proxy behavior on all firewalls a feature to look for. Most SMTP proxies we tested were designed to protect pre-1984 versions of sendmail. No product properly handled the newest SMTP service extensions that make up the Extended Simple Mail Transfer Protocol, a fact that reduces e-mail security.

For simpler services that don't need much intelligence in the proxies, such as telnet or ping, network managers generally focus on the rule side of the firewall. Here the differences are more subtle but less significant. For example, Watchguard Security System, Elron Firewall, Cisco's PIX and Microsoft's Proxy Server do not support time-of-day or day-of-week restrictions. Yet few network managers significantly change their security policies just because 5 p.m. rolls around.

Other differences are more important. For example, Ukiah Software's NetRoad FireWALL has no concept of a deny rule — any rule in the database is an exception to the general policy of drop everything. Even those with simple network configurations may find this a difficult restriction. Similarly, Elron Firewall makes assumptions about the behavior of

TCP/IP stacks, which makes it incompatible with systems that may use port numbers lower than 1,024 — which are unusual but perfectly legal.

For small networks, the service-based approach, which defines the services that should be allowed or disallowed in each direction, generally is sufficient. Watchguard Security System and Elron Firewall take this approach. However, for larger networks or those with more complex connections to the outside world, the address-based approach used in most other products may be necessary in order to translate the network security policy into a firewall configuration.

Larger networks might also find address-based Proxy Server too restrictive because it requires Microsoft-provided Windows-only client software for all but HTTP, Gopher and FTP traffic.

Even among the address-based firewalls there are significant differences. For example, Check Point is the only vendor that lets you decide whether a denied connection should be silently ignored or rejected immediately.

We were impressed by the additional security features built into some products. For example, Watchguard Security System dynamically modifies the network security policy to restrict all traffic from some nodes if it detects an attempted break-in. Watchguard also can detect and evade some common attacker probing tools. Products from Microsoft, Check Point, Cisco, CyberGuard, NetGuard and Ukiah Software also provide some protection against TCP SYN floods, a common denial-of-service attack. Check Point's strategy is particularly impressive — it not only documents the attack well but it also gives you several options for how to handle it.

Watching and counting

Even as firewall management evolves onto a secure management station, logging and monitoring tools remain fairly primitive, though usually adequate. An exception is Elron Firewall, which does not pro-

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vide session logs. We think that's unacceptable in a firewall.

We were most impressed by the real-time display features built into CyberGuard's CyberGuard Firewall and NetGuard's Guardian. Guardian, for example, lets you look at current connections through the firewall, bandwidth utilization and other statistics, all updated in real time. During firewall configuration we found these displays to be helpful in understanding how the firewall was interpreting our rule sets. Similarly, during a suspected security emergency, this kind of summary information can help you pinpoint a problem.

Reporting on logs is a weak spot in most products. Generally, most products we looked at provide raw logs that you feed to a tool such as Perl to generate summaries. Cisco, Check Point, CyberGuard and Ukiah Software all take this approach. Watchguard Security System has stronger reporting tools, although they are separately licensed.

NetGuard offers some basic summary tools, as well. Microsoft leads the pack by providing additional analysis tools (installed, but not licensed, separately) for some logs and by optionally logging directly to a SQL or Open Database Connectivity-compliant database.

Documentation

Documentation, too, continues to be a weak point for many products. Leaders on the documentation front include Microsoft, which puts all its documentation in online form, including fairly extensive tutorial information. Microsoft, however, fails to include printed documentation, and printing from its online documents is cumbersome and results in enormous piles of paper.

Check Point's FireWall-1, Cyber-Guard's CyberGuard Firewall and Watchguard Technologies' Watchguard Security System all have excellent online and printed documentation. They could, however, go further in explaining the theory and operation behind the firewalls.

Cisco's PIX has documentation to match the firewall: small and precise, combined with the CD-ROM version of Cisco's online information system. Although the documentation looks skimpy, we were able to configure and manage the firewall very well, which is the acid test of good documentation.

Elron Software's Elron Firewall, NetGuard's Guardian and Ukiah Software's NetRoad FireWALL all have average-to-poor documentation. The worst of the bunch is NetRoad FireWALL, which includes more than 100 pages of security tutorial, almost none of which is tied directly to product features and specifications. We spent more time on the phone with Ukiah Software than with any other vendor trying to understand how its product worked and how it could be configured. Elron Software does a slightly better job on its documentation but abbreviates the documentation set too much for comfort. For example, its product acts as a bridge, not a router. That's a perfectly valid way to build a firewall, but it's very unusual — only one other firewall on the market, Network-1 Software & Technology, Inc.'s Firewall Plus, uses that approach. Yet this significant difference was never explained in the documentation; we had to figure it out for ourselves.

Buying time

We were happy to see that old favorites haven't rested on their laurels: Check Point's FireWall-1, CyberGuard's CyberGuard Firewall and Cisco's PIX all have made progress since we last tested them, unlike some of the products we've tested in past firewall Buyer's Guides. Even better, the young turks —

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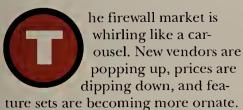
Watchguard Technologies and NetGuard especially — put on a strong first showing.

Microsoft may have missed the mark on this first firewall-capable version of its proxy server but given the company's resources and marketing muscle, this is clearly a product to watch. Similarly, Ukiah Software and Elron Software are not at the top of our list but have taken good first steps. Elron should be particularly interesting if you have to deal with non-IP protocols, such as IPX, DECnet and AppleTalk.

Negotiating your way through a maze of firewalls

Here's what to look for as new vendors join veterans to heat up the competition for your security dollars.

By Joel Snyder



New vendors — we found seven since last year — are flooding the market with products and helping



drive prices down. Firewalls were a \$30,000 item three years ago; today, most cost less than \$5,000.

It's easier to write a simple firewall than a big one, so even if they won't admit it, most of these newcomers are putting out products designed for small and midsize enterprises. And since Check Point Software

Technologies, Ltd.'s FireWall-1 dominates the high-end firewall market, it makes sense for the new entrants to concentrate on low-end "appliance" firewalls that Check Point doesn't provide. Most firewalls, especially the new ones, are also aimed primarily at providing protection for Internet connections.

Small firewalls are designed for certain canned configurations and with certain assumptions; they don't have all the flexibility a high-end network security guru wants. For example, take one-time encryption for incoming telnet sessions — many small network managers don't even know what telnet is, so there's no point in worrying about it.

Only three vendors' products — Ascend Communications, Inc.'s Secure Access Firewall, Galea Network Security, Inc.'s Avertis and Internet Devices, Inc.'s Fort Knox Policy Router — are stuck in the 10M bit/sec Ethernet world. Everyone else supports Fast Ethernet, and several vendors support ATM, Gigabit Ethernet or both.

The days of the two- or three-Ethernet interface firewall are also numbered. Originally, all firewalls had two interfaces: "inside" and "outside." Then they all added an extra one, dubbed the demilitarized zone. Now that managers of big networks have figured out that three zones are not sufficient to provide good security, they often use many more, depending on how the company is segmented. While a few products today still only allow for three interfaces, most of the products in our chart let you add more than three network connections.

Along with new products come new platforms. While Unix once was the standard, today the bulk of the products also support Windows NT. (In fact, LanOptics, Inc. and Internet Dynamics, Inc. support only NT.) This is a nod to an increasingly NT-centric world rather than an indication of better technology for the firewall engine.

Firewalls are also turning to NT and Windows 95 for their graphical configuration, logging and alerting functions. Thus, with many products you can now run the firewall from a remote workstation. Moving the graphical user interface to a different workstation has another benefit: It lets you manage multiple firewalls from a single point. Vendors have jumped hard on this feature; only a scant few currently fail to support some kind of centralized management and reporting.

Firewall vendors have quietly moved to a common position on the

Continued on page 60



PRODUCT CHART: FIREWALLS

Company	Product	LAN int	erfaces		200				Server platforms	Non-	IP proto	ocols		Access	control		-	1000	ם	
		ATM	Ethernet	Fast Ethernet	Gigabit Ethernet	FDDI	Token ring	Maximum number of interfaces of all types		AppleTalk	DECnet	IPX/SPX	NetBEUI	Packet filtering	Packet filtering with stateful inspection	Proxy support at application layer	Proxy support at transport layer	Network address translation	Hardware token/smart card	Software certificate and
Software							•			'		'	1	i						
AbirNet, Inc. (817) 251-7000 www.abirnet.com	SessionWali-3		(1)	(1)	(1)	(1)	(1)	(1)	Windows NT											
AXENT Technologies (800) 298-2620 www.axent.com	Raptor Firewall for NT/Solaris		(1)	(1)		(1)	(1)	64	Windows NT and Solaris					•						
Check Point Software Technologies, Ltd. (800) 429-4391 www.checkpoint.com	FireWall-1 3.0	(1)	(1)	(1)	(1)	(1)	(1)	32	Windows NT, AIX, HP-UX, Sun OS and Solaris										•	
CSM-USA, Inc. (801) 547-0914 www.csm-usa.com	CSM Proxy/ Enterprise Edition	(1)	(1)	(1)	(1)	(1)	(1)	(1)	Windows NT Solaris and Linux									•		
Digital Equipment Corp. (800) 344-4825 www.altavista.software.digital.com	AltaVista Firewall 98	3	3	3	3	3	3	3	Windows NT and Digital Unix					•	•				•	
Eiron Software, Inc. (800) 406-5828 www.eironsoftware.com	Eiron Firewall/ Secure 320S		3	2				3	Windows NT and proprietary			•		•						
Fortress Technologies, Inc. (800) 793-9202 www.fortresstech.com	NetFortress He@tSeeker Pro		(1)	(1)	(1)	(1)	(1)	(1)	Windows NT and NetWare			•		•						
Global Technology Associates (800) 775-4482 www.gnatbox.com	GNAT Box Firewall		3	3		3		3	Proprietary									•		
1BM (800) 426-2255 www.ibm.com	IBM eNetwork Firewall	(1)	(1)	(1)	(1)	(1)	(1)	(1)	Windows NT and AIX								•			
internet Dynamics, Inc. (630) 953-7700 www.interdyn.com	Conclave		(1)		(1)			8	Windows NT									•		
Microsoft Corp. (425) 880-8080 www.microsoft.com	Proxy Server 2.0	(1)	(1)		(1)	(1)	(1)	(1)	Windows NT		•	•		•			•			
Milkyway Networks Corp. (613) 596-5549 www.milkyway.com	SecuriT Firewall	(1)	(1)		(1)	(1)		(1)	Windows NT, Sun OS and Solaris									•		•
NetGuard, Inc. (703) 359-8150 www.ntguard.com	Guardian 3.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	Windows NT									•		
Novell, Inc. (801) 228-4272 www.novell.com	BorderManager	64	64	64	64	64	64	64	NetWare											
SmallWorks, Inc. (512) 338-0619 www.smallworks.com	Netgate Firewall		(1)	(1)		(1)	(1)	256	Windows NT, Sun OS and Solaris						•				•	
Trusted Information Systems (888) 347-3925 www.tis.com	Gauntlet Internet Firewall	(1)	(1)	(1)		(1)	(1)	(1)	Windows NT, Solaris, DMS, BSDI and IRIX								•	•	•	
Uklah Software, Inc. (800) 988-5424 www.ukiahsoft.com	NetRoad FireWALL for Windows NT 2.0		(1)	(1)			(1)	(1)	Windows NT and NetWare											
Software and/or Server			-								-									
ANS Communications, Inc. (800) 456-8267 www.ans.net	ANS InterLock	(1)	(1)	(1)		(1)	(1)	32	Solaris									•		
CyberGuard Corp. (800) 666-4273 www.cyberguard.com	CyberGuard Firewall Release 4 for Unix	8	8	8		8	8	8	SCO UnixWare					•				•		•
LanOptics, Inc. (800) 533-8439 www.ntfirewall.com	Guardian	2	4	4	4	4	4	4	Windows NT						•			•	•	
Network-1 Security Solutions, Inc. (800) 638-9751 www.network-1.com	FireWall/Plus for NT	2	2	2	2	2	2	2	Windows NT and proprietary			•				•				

Products highlighted in color were tested. Blue Ribbon winner. (1) Limited only by server platform. (2) NetScreen-10 = three Ethernet interfaces and NetScreen-100 = three Fast Ethernet interfaces. (3) Blocking is

Block				Security		Ě		Manage	ement														Repor		Cost
Java applet blocking based on user-defined rules	ActiveX blocking based on user-defined rules	URL blocking	Scans e-mail for viruses	Detects and resets unauthorized security configuration changes	Real-time intrusion alerts	Real-time intrusion avoidance	Disables proxies	Centralized management of multiple firewalls	SNMP management	Local management	Remote management	Defines relative importance of varying network traffic	Configures firewall to perform ingress filtering	Time-based access controls	Automated log scanning	Firewall shuts down external face when log is full	Alarm notification by page or e-mail	Disable access	Logs attempts once access has been denied	Uses intelligent intruder identification	Identifies transfer of predefined sensitive files	Identifies/logs/blocks attempts to spoof	Summary reports (by user ID or IP address)	Charts and graphs network activity	
	•		Built in						•	Other GUI	None	•		•			•				•	•		•	\$1,495 to \$14,950
			Add-on							Other GUI	Other GUI								•	•		•	•		\$3,995 to \$15,000 and \$6,500 to \$25,000
	•		Add-on					•		Other GUI	Other GUI		•												\$2,995 to \$18,990
•	•		Built in							Browser-based and other GUI	Browser-based		•				•	•	•						\$1,495
		•	Add-on	•						Browser-based	Browser-based	•	•						•	•	:	•	•		\$2,496 to \$14,995
•		•								Other GUI	Other GUI	•	•		•	-		•				•	•		\$2,995 and \$4,995
•	•	•		•		•		•		Other GUI	Other GUI				•		•	•	•	•	•		•		\$745 to \$100,500
		•	Add-on			•		•		Other GUI Browser-based and command	Browser-based Browser-based and command		•	•	•	N/A	•	•	•	•		•			\$995
•	•	•	Add-on		•			•		line	line		•	•			•		•			•	•	•	\$2,499
•	•		Built in		•			•		Other GUI Browser-based,	Other GUI Browser-based,	•	•		•		•	•	•			•	•	•	\$2,495
		•	Add-on		٠	-		•	•	other GUI and command line	other GUI and command line			•			•	•					•		\$995
•	•		Add-on		•		•	•		Other GUI	Other GUI		•		•		•		•				•	•	\$1,950 to \$19,500
			Built in		•		•			Other GUI	Other GUI				•		•					•	•		\$3,980 to \$8,980
	•	•	Add-on		•					Other GUI and command line	Other GUI			•			•		•				Both	•	\$995
										Other GUI and command line	Other GUI and command line						•	•	•			•	•	•	\$2,500
	·	•	Add-on							Browser-based	Browser-based		·									•			\$5,000 to \$17,500
		Ŀ	Add-on							Other GUI	Other GUI						ŀ			•		ı	•		\$995 to \$12,500
•	•	•		•			•	•		Command line	Other GUI and command line		•			•			•	•	•	•	•		\$499 to \$1,199
•	•		Built in				•		•	Other GUI	Other GUI	•	•			•	•			•	•	•		•	\$5,995 to \$14,995
			Add-on				•			Other GUI	Other GUI		•						•				•		\$2,480 and \$4,480
										Other GUI	Other GUI		•	•									•	•	\$3,750



PRODUCT CHART: FIREWALLS

Company	Product	LAN int	terfaces						Server platforms	Non-	P prote	cols		Access control									
		ATM	Ethernet	Fast Ethernet	Gigabit Ethernet	FDDI	Token ring	Maximum number of interfaces of all types		AppleTalk	DECnet	IPX/SPX	NetBEUI	Packet filtering	Packet filtering with stateful inspection	Proxy support at application layer	Proxy support at transport layer	Network address translation	Hardware token/smart card	Software certificate and key management			
Server	1				'	1																	
BDM International, Inc. (888) 842-9237 www.cybershield.com	Cybershield	4	16	16		3	6	23	DG/UX with B2 security option														
Compaq Computer Corp. (800) 888-5858 www.compaq.com	ProSignia and ProLlant Firewall Servers		7	7		7	7	7	Windows NT					•				•					
Routers	'																						
3Com Corp. (800) 638-3266 www.3com.com	NETBullder	8	48	8		8	8	64	Proprietary			•	•		•			•					
Ascend Communications, Inc. (800) 272-3634 www.ascend.com	Secure Access Firewall		1 or 2					96	Proprietary									•					
OneBOX Networks, Inc. (888) 663-2698 www.oneboxnetworks.com	0N-100		30	4				34	Proprietary														
Stand-alone devices																							
Bay Networks, Inc. (800) 822-9638 www.baynetworks.com	Extranet Switch 4000/ Extranet Switch 2000		4	4				7	Proprietary									•					
Cisco Systems, Inc. (800) 553-6387 www.cisco.com	PIX Firewall 4.1		3	3			2	3	Proprietary									•	•				
Galea Network Security, Inc. (888) 464-2532 www.galea.com	Avertis		6					6	Proprietary														
Internet Devices, Inc. (408) 541-1400 www.internetdevices.com	Fort Knox Policy Router		3					3	Proprietary					•				•					
Lucent Technologies, Inc. (800) 288-9785 www.lucent.com/security	Lucent Managed Firewall		3	3				3	Windows NT and Solaris														
NetScreen Technologies, Inc. (408) 970-8889 www.netscreen.com	NetScreen-10 and NetScreen-100		(2)	(2)				3	Proprietary														
Radguard, Ltd. (201) 828-9611 www.radguard.com	ciPro		2	2				2	Windows NT and VX Works		•							Ī					
Technologic, Inc. (800) 615-9911 www.tlogic.com	Interceptor Firewall Appliance		12	12		2	2	12	BSDI					•		•		•	•				
WatchGuard Technologies, Inc. (206) 521-8340 www.watchguard.com	WatchGuard Security System		3	3				3	Windows NT and Red Hat Linux					•		•		•		•			

Products highlighted in color were tested. Blue Ribbon winner. (1) Limited only by server platform. (2) NetScreen-10 = three Ethernet interfaces and NetScreen-100 = three Fast Ethernet interfaces. (3) Blocking is

packet filter vs. proxy debate. Packet filtering (stateful or not) was formerly thought to be faster and more flexible because packets pass through packet filters based on header information at a lower level of the protocol stack. Transport and application proxies, which interpret packet information on the application level, were thought to be more secure because the firewall actually understood and retransmitted application commands.

In fact, a combination of the two is what is needed: packet filtering for speed and flexibility in applications that don't require proxying, and

proxying for applications such as HTTP in which you want to look in the datastream and let some, but not all, data through. Instead of a single approach, the bulk of the vendors offer stateful packet filtering (often called smart filtering or stateful inspection) and application-layer proxies.

The clear benefits of packet-filtering approaches — speed and simplicity — are being combined with corporate requirements for certain application-layer proxies, particularly virus checking of e-mail and Web pages, filtering of Java applets and ActiveX components, and URL

blocking. Most vendors claim to support virus scanning, URL blocking, or both. These features were unheard of in firewalls only two years ago.

Some high-end options, such as failover capabilities, are still rare.

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High-availability firewalls are hard to find — only seven vendors advertise their offerings as true failover-capable products. External monitoring is a little more common, with just over half of the products connected to SNMP management agents.

Other previously high-end features, such as automated scanning of logs to identify potential security problems and time-based access controls, are becoming quite common. The majority of vendors' products intelligently scan logs, and most let network managers use time-based access controls.

Firewall vendors are also pushing

Block				Security				Manag	ement														Repo		Cost
Java applet blocking based on user-defined rules	ActiveX blocking based on user-defined rules	URL blocking	Scans e-mail for viruses	Detects and resets unauthorized security configuration changes	Real-time intrusion alerts	Real-time intrusion avoidance	Disables proxies	Centralized management of multiple firewalls	SNMP management	Local management	Remote management	Defines relative importance of varying network traffic	Configures firewall to per- form ingress filtering	Time-based access controls	Automated log scanning	Firewall shuts down external face when log is full	Alarm notification by page or e-mail	Disable access	Logs attempts once access has been denied	Uses intelligent intruder identification	Identifies transfer of predefined sensitive files	Identifies/logs/blocks attempts to spoof	Summary reports (by user ID or IP address)	Charts and graphs network activity	
(3)	(3)		Add-on		•					Command line	Command line		•			-									\$35,000 to \$150,000
•			Add-on		•				-	Other GUI	Other GUI		-				•			•					\$5,860 and \$15,090
										Browser-based, other GUI and command line	Browser-based, other GUI and command line														\$895 to \$115,500
L			Add-on					٠,		Other GUI	Other GUI														\$1,395 to \$3,995
		ŀ								Other GUI	Command line		<u> -</u>												\$3,500 to \$7,800
					•				•	Browser-based	Browser-based				•							•			\$20,000 and \$50,000
						•				Command line	Browser-based						•						•	•	\$9,000
				•						Browser-based and command line	Browser-based			•			•		•			•		- 1	\$20,000
		Ŀ						•		Browser-based	Browser-based		•			•			•				•		\$1,995 to \$9,995
								•		Browser-based	Browser-based		•												\$15,995
	J								•	Other GUI and command line	Browser-based		•	•					•			•			\$3,995 and \$9,995
		•		•		•				Other GUI	Other GUI	•	•	•	•		•		•	•	•			•	\$5,450
•		-				•	•	•	•	Browser-based	Browser-based				•					•				•	\$3,995 to \$9,995
•	•					•		•		Other GUI	Other GUI						•					•	•	•	\$3,995

on/off function, not based on user-defined rules.

CHART COMPILED BY SUZANNE GASPAR

their products as all-in-one solutions to network security. While this approach was not popular in the past, vendors are taking a slightly different tack by including features such as virtual private networks (VPN) and bandwidth management. We think creating a single point of failure for highly divergent functions is unwise, but the market will make its own decision in the coming months.

VPNs are commonplace: only a handful don't make them available. Today there are numerous proposed security standards for VPNs. Twenty-one vendors support IP Security (IPSec), five support Simple Key Management for IP (SKIP), and seven support Point-to-Point Tunneling Protocol (PPTP). Key management is also still up in the air. Twelve support the Internet Security Association Key Management Protocol (ISAKMP/Oakley),

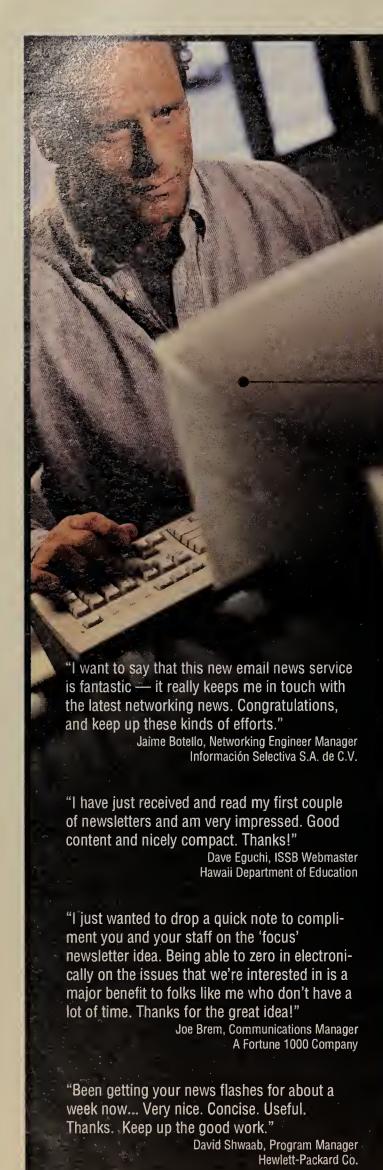
Firewalls in flux

Since our last firewall Buyer's Guide (*NW*, Feb. 3, 1997, page 41), many firewall companies and products have changed hands. The vendors with the oldest products, Trusted Information Systems, Inc. and Digital Equipment Corp., have been acquired by Network Associates, Inc. and Compaq Computer Corp., respectively. Secure Computing Corp. and BorderWare merged. Cisco Systems, Inc. now sells Global Internet's Centri, and Elron Software, Inc. now sells ONGuard and has renamed it Elron Firewall.

with the rest using a variety of techniques.

Bandwidth management (also called traffic shaping) is available in 11 firewalls. Look for incoming service load balancing and failover and high-end routing protocols such as Border Gateway Protocol (BGP4) and Open Shortest Path First (OSPF) to be added to many products shortly. While you might not want your firewall to take on routing chores, given the complexity of corporate networks, the firewall may have to know how to route in order to fit it in.

With so many choices and with standards still to be set, you may be tempted to wait, knowing that prices will drop. Don't give in to that temptation. Design a security policy, then find the firewall that's available today that lets you implement it best.



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search first for info that interests me. Ninety-

five percent of my Web surfing consists of IT

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http://www.nwfusion.com/focus

FEATURE

Talkin' Web management

Roundtable highlights how new tools compound integration problems, but get disparate teams talking.

By Neal Weinberg

irst, the bad news. Network IS departments that for years have been striving to consolidate network and systems management systems around fewer consoles are finding they're taking a giant step backward now that a slew of Web management tools is being added to the mix.

The good news is that the need to manage Web servers, content and applications is forcing network operations people, network designers and application developers to get together and do some much-needed planning — possibly for the first time.

Those were the key trends identified at a *Network World* roundtable discussion on Web site management conducted last month at Net-World+Interop 98 in Las Vegas. The discussion was moderated by John McConnell, president of McConnell Associates, Inc., and included representatives from six Web management tool vendors: Arrowpoint Communications, Inc. in Westford, Mass.; Atreve Software, Inc. in Cambridge, Mass.; Bright Tiger Technologies, Inc. in Acton, Mass.; Resonate, Inc. in Mountain View, Calif.; NextPoint Networks in Westford, Mass.; and Packeteer, Inc. in Cupertino, Calif.

Atreve's WebSpective product illustrates the integration problem. Swapnil Shah, the company's vice president of product strategy, says WebSpective is designed to monitor the performance of online applications in real time. The product will not only

"If you think things are complex now, you should see what people have on the drawing board."

Christopher Marino CEO, Resonate, Inc.

alert you when a Web server goes down, but also tell you which application is affected, he says. This gives you the option of bringing up a backup server or rerouting traffic to another server, depending on the importance of the application.

But WebSpective is totally Web-based and does not talk to SNMP-based management tools. So if a problem with a SAP R/3 application is affecting online transactions, WebSpective will notify you that a problem exists, but you'll have to use other tools to figure out what the problem is.

McConnell says the lack of integration between traditional tools and their Web-based cousins is a small price to pay for being able to solve thorny Web management problems.

Besides, he argues, few companies were able to achieve the elusive goal of integrated network and systems management even before the World Wide Web came along.

Bruce Sweet, vice president of engineering and development at NextPoint, says customers are not asking that NextPoint's Street Savvy Software (S3), which monitors service-level agreements (SLA), integrate with existing platforms. In fact, NextPoint wants users to look at the Web as the platform of the future for network- and application-level management tools, rather than current LAN-based platforms.

Forced collaboration

Sweet adds that when companies begin deploying S3 and start thinking about ways to measure the response time of a Web-based application, they realize their network operations people need to work with those who design networks and write applications.

"We become the reason these guys get into a room together and start talking to each other," Sweet says.

Resonate CEO Christopher Marino adds that until the Web came along, operations people and planners often worked in isolation. "Now all these things are overlapping to an amazing extent that's stressing organizations in terms of how they get these problems solved," he says.

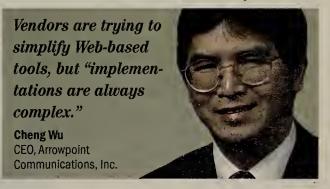
Steve Martel, principal network analyst at Boston-based Liberty Mutual Life Insurance Co., says it's true that he typically doesn't get involved with the in-house people developing a new application "until they want to hit the network with it." But his goal is to change that. As he rolls out new

SLAs, his aim is to "plug in sooner" to the application development process.

Complexity: Get used to it

The vendors concede that managing a Web site adds a new layer of complexity to a net manager's life, but they say it's unavoidable. Web sites are so fundamentally different from typical client/server operations that a whole new set of tools is a must.

Vendors say they are making a concerted effort to reduce complexity by automating their tools as much as possible. For example, once Packeteer's PacketShaper bandwidth management tool is installed, it identifies on its own what types of traffic are running on the network, says Bob Quillin, vice president of marketing. The customer follows a series of menus to set priorities,



and the product uses flow-control techniques to allocate bandwidth.

Similarly, Smart Cluster from Bright Tiger keeps track of content on multiple Web servers as well as the availability of the back-end database or application servers, says Jim Hourihan, the company's vice president of marketing. Armed with that information, Smart Cluster can direct users to the location that offers the quickest response time, he says.

The vendors are also trying to keep things simple by sticking to standard protocols and using techniques such as virtual IP addressing to provide service to multiple users under a single address, says Arrowpoint CEO Cheng Wu. Ultimately, however, "implementations are always complex," he says.

And it may get worse before it gets better. "The days of static Web pages and HTML are long gone. Looking at a Web site today, particularly an Internet commerce site, it's almost unrecognizable from what it was even six months ago," Marino says. "And if you think things are complex now, you should see what people have on the drawing board. It's even worse."

Management Strategies Watching the clock

If you regularly work more than 50 hours per week, experts say you may be working too much.

eeting the in-laws for the first time is always a momentous occasion. But when you're an IT worker, such events often get squeezed in between deadlines. Just ask Beverly Russell, director of IS at jam manufacturer E.D. Smith & Sons, Ltd. in Winona, Ontario.

After spending a full Saturday at the office, Russell dashed home and had less than an hour to get ready before her daughter's future in-laws rang the doorbell. The group got acquainted over cocktails and then headed out to dinner. Russell went home around 9 p.m. and worked until 3 a.m. to ensure a new fiscal inventory would be ready for the year-end close happening at dawn.

That same week, she also worked a 21-hour day to complete installation of the company's new warehouse management system.

For Russell and others, working more than 50 hours per week — often at odd times — is par for the course. The best time to do maintenance is when users aren't on the network. And there are always fires to fight and projects to complete under tight deadlines.

Keith Hennig, senior network analyst at The Quaker Oats Co. in Chicago, recently worked an 80-hour week installing new hardware. Likewise, a software upgrade last year at industrial automation distributor Control Corp. of America in Richmond, Va., translated into an 80-hour week for MIS Director Brent Reed.

Network administrators who manage worldwide networks face the added challenge of arranging their schedules to work with users across multiple time zones. "When we're getting on the network, Asia is getting off," says Mike McClure, network administrator at ICN Pharmaceuticals, Inc. in Costa Mesa, Calif. "And when we're getting off, Eastern Europe is getting on. If I'm working with someone in Russia, I have to be in the office at 1 a.m."

How much is too much?

While working long days is often a fact of life for network professionals, most agree the ideal workweek shouldn't exceed 50 hours — or at least not by much.

McClure likes to keep his workweek to less than 55 hours. "It's easy enough to deal with and you have a little bit of a life," he says. "Anything more than that, and it seems like you're here all the time."

And then there are those who want something a little different. Reed aims to work four 10-hour days and be on call the fifth day.

By Louise Fickel

Hennig prefers to avoid the question altogether. "I've never really thought of an ideal limit," he says. "If I did, I'd get depressed because I'd realize how little I earn per hour."



Beverly Russell, director of IS at E.D. Smith, often has to tackle a project at inopportune times.

Follow the leader

How much do IT managers expect their staffs to work? Under ideal conditions, about 40 hours per week. But when problems arise, many expect their employees to pitch in with gusto.

"When I need them to finish a project, I expect them to work the hours that I would work," McClure says. And when employees do what it takes to get the network back up, not everyone receives overtime pay. "They're salaried so it comes with the territory," says a network administrator at a marketing firm in North Carolina.

At the same time, avoiding burnout is crucial. "I tell my people that if you can't get your job done in 40 hours per week, there's something wrong," says Steve Lopez, network director at the National Board of Medical Examiners in Philadelphia. "If necessary, I will throw an additional person at a project. Otherwise, you burn out very fast. This is especially true in network management. It's a very high-stress job."

Management consultants say it's impossible to define an ideal workweek. "The maximum num-

ber of hours that people should work depends on a number of factors, such as the intensity of the work, the person's level of motivation and the environment," says Walid Mougayar, president of CYBERManagement, Inc. in Toronto. "Some people can work 12 hours a day while others get burned out after 8 hours."

But as a rule, IT managers should plan for their employees to work 40 hours per week on a normal basis, according to Victor Danevich, managing consultant at International Network Services in Burlington, Mass. "In reality, it's going to creep up to 50. Beyond 60, you begin to hit the point of diminishing returns," he says.

Still, Danevich says that the occasional 80-hour workweek isn't uncommon when companies are working on a special project or upgrade.

The issue of working long hours won't disappear anytime soon. According to many IT professionals, the advent of more sophisticated technology has resulted in longer — not shorter — days.

"[Previously], the network wasn't as missioncritical as it is now," Lopez says. "But now my network is the system. As a result, we put in more hours to make it dependable."

Reed attributes the increase in his hours to more users tapping into the network and a jump in maintenance requirements.

However, that same technology is making it easier for network managers to put in additional time.

"Thanks to corporate networks and the Internet, people can work anywhere now. And since they can chop up their hours between different locations, they can go longer," Mougayar says.

Whatever side people take in the debate, one thing seems fairly certain. Not everyone is cut out for the long hours. "This is not an 8 [a.m.] to 5 [p.m.] industry. I tell people that it's a lifestyle rather than a profession," Hennig says.

"For anyone who doesn't want this kind of life, IS isn't the best career choice," Russell says. Apparently, her experiences have made an impression on at least one person. Russell's daughter recently opted for a career as a Web designer. But someone else at E.D. Smith will have to handle the year-end close this Labor Day weekend. Russell has no intention of missing her daughter's wedding.

Fickel is a freelance writer in Yellow Springs, Ohio. She can be contacted at RiceKid@ix.netcom.com.



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- Architectures

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June 1

June 3

6/8 Management Strategies: Network Managers' job-related volunteerism; Feature: Strategies for handling Net-enabled systems; Review: Seagate NerveCenter: Cool Tool column: Tripmate; Internetworks, Special Focus: A look at how companies are using traditional routers; Bonus Distribution: Supercomm ICA, Atlanta;

6/15 Management Strategies: Net performance reports; Feature: Service and Support survey; Review:

Workgroup servers; Intranet Apps., Special Focus: Web transactionbased; Bonus Distribution: PC Expo,

NY apps

6/22 Management Companies that employ teens; Feature: Planning for fault-tolerant NT; Review: Cool Tool column: Gotcha, Eyecatcher; LANs Special Focus: Viability of low-cost network PCs June 10

6/29 Management Strategies: The games IT plays at work; Feature: Buyer's Guide: IP telephony gateways & servers; Carriers & ISPs, Special Focus: RBOC long distance progress. June 17

7/6 Feature: How industry is being altered by the internet; Special Focus: The use of IP in mainframe environments

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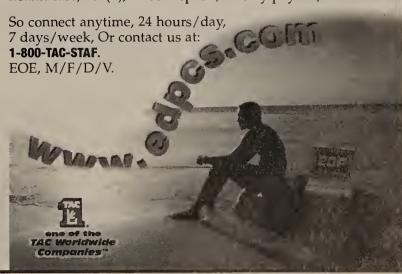
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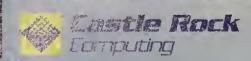
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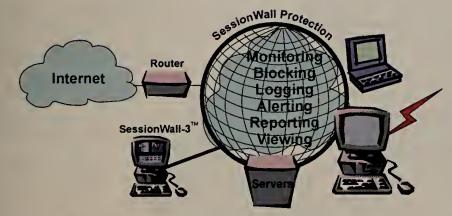
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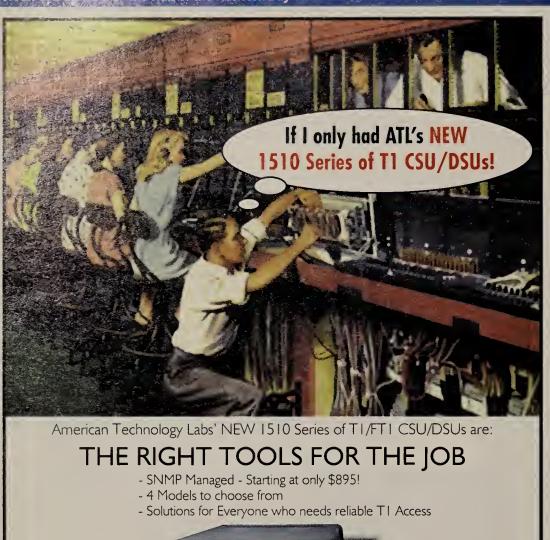
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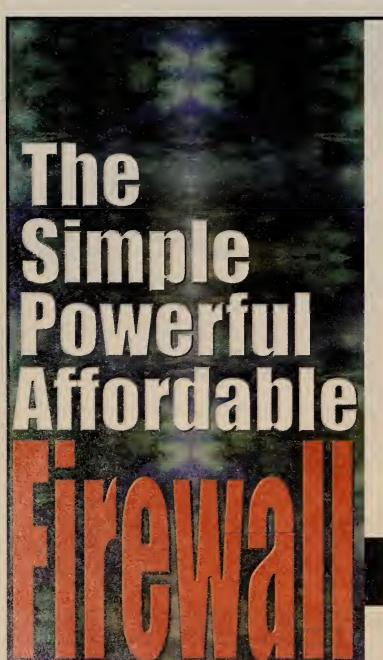
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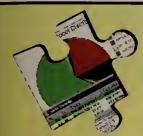
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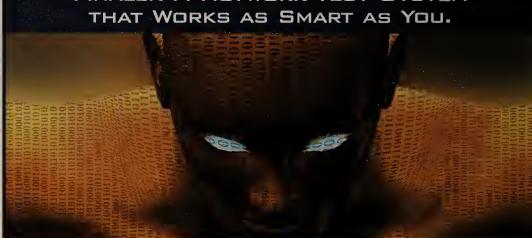


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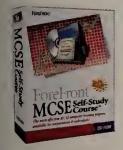
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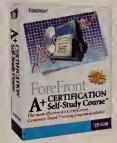
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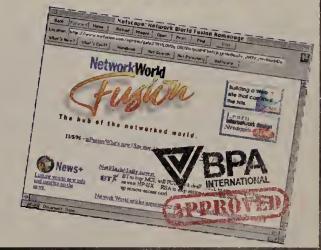
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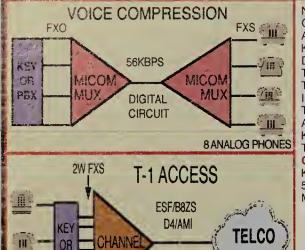
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Report card: Netscape support up a notch

By Andy Eddy

Mountain View, Calif.

Netscape Communications Corp. is pinning its hopes on its drive into the enterprise, but is the company's customer support good enough to keep big business coming back for more?

A while ago, the answer was probably no. In fact, in previous interviews with customers, *Network World* uncovered concerns about Netscape's support. But similar calls last week brought relatively few negative comments.

Keith Foxe, the director of promotions and communications for Sunnyvale, Calif.-based Internet Shopping Network, Inc. (ISN), was extremely positive in expressing his company's experiences with Netscape. "I'm not shy about saying otherwise, but [Netscape has] been excellent. It looks at this as its future and seems really concerned about giving the customers the kind of attention that most dream of," Foxe said.

Foxe explained that ISN is using Netscape's Application Server (previously called Kiva Enterprise Server) on 14 Sun Ultra servers to handle 50,000 unique visitors per day and approximately 3,500 auctions, moving more than 10,000 items per week on its FirstAuction site.

Another large-scale customer is Hongkong Telecom, the largest telecommunications company in Hong Kong. The company's general manager of Internet and intranet applications, Riyaz Moorani, said Netscape's Application Server handles transactions with its more than 3.5 million customers, enables connection to legacy applications, and also manages some of the company's interactive television applications.

"When we looked at the browser and server market at the time, we felt that Netscape was the right choice. We didn't want to be tied to one platform, being able to go with Unix or NT. We also run the largest ISP in Hong Kong, so it determines what kind of products we use," Moorani said.

From a support standpoint, Moorani admitted that support in Asia seems "second to American support," with occasional problems due to the difference in time zones. However, "By and large, we have been quite satisfied," Moorani added.

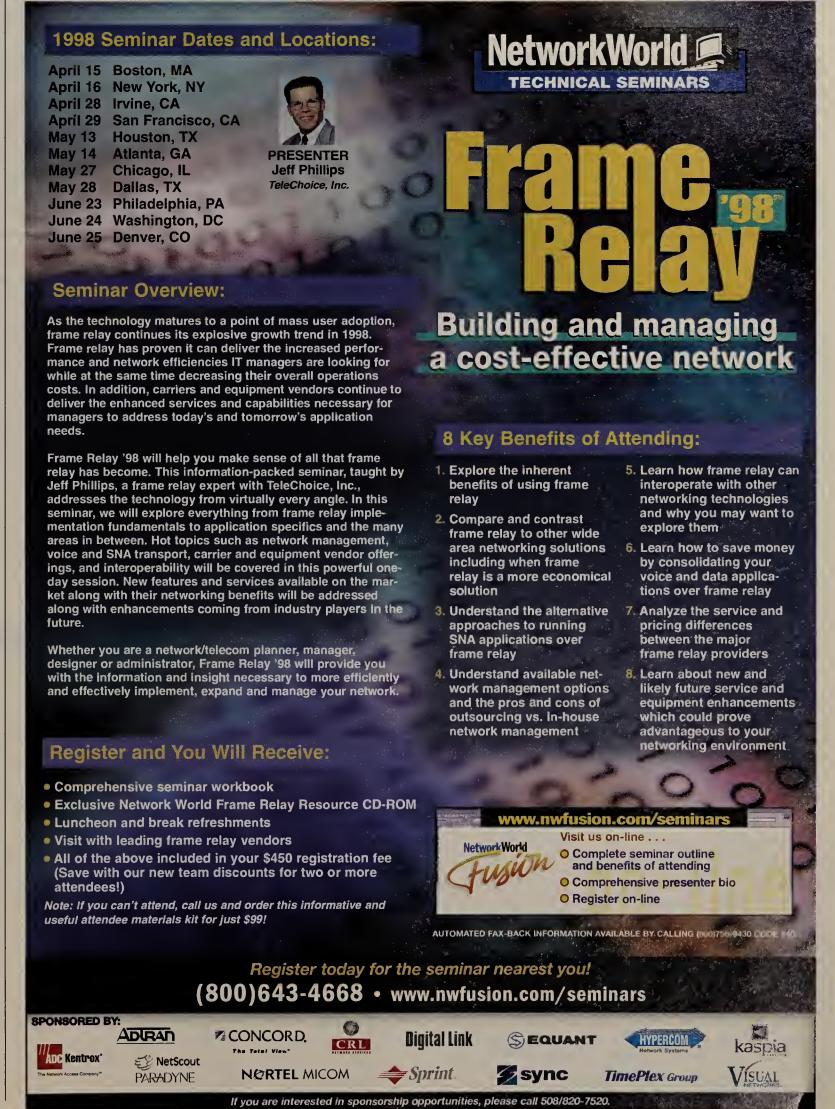
Certainly the recent big-banner announcement of Netscape's licensing of software to financial giant Citibank adds credence to the notion that Netscape can provide adequate support to large customers. While neither side is disclosing the financial arrangements of the deal, Netscape is claiming the Citibank deal as its biggest software sale to date. According to a Citibank spokeswoman, the deal involves elements of the CommerceXpert suite of electronic commerce products, Application Server and

the SuiteSpot line of servers.

"We will build a platform to support inhouse product and vendor solutions . . . with scalable legacy migration," she said. "For what we needed, we felt that [Netscape] represented the most complete solution."

She did note that Citibank's scope

requires many of different products, and Netscape provides some of those pieces. "We're in 100 countries, so if it's out there, it's in our operation," she said.



Cisco spells DSL with four new CPE products

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc. last week unleashed a bevy of digital subscriber line (DSL) products, offering users a comprehensive portfolio of high-speed Internet access alternatives.

In all, Cisco rolled out eight new products, four of which are targeted at customer premises. Analysts said the product line could give service providers incentive to turn out DSL services more quickly.

The four customer premise products are the 626 ATM25 ADSL Modem, the 676 SOHO/ Telecommuter Router, the

1401 Small Office ATM25 Router and the 3600 ATM25 Network Module, all of which support data rates from 32K bit/sec to 8.1M bit/sec.

Combined with four DSL products for carriers and service providers, the new offerings will allow Cisco to provide users with end-to-end Internet access via consistent DSL services and products that work together.

"Having an end-to-end solution from an equipment standpoint is an integral part in providing a universal service, such as DSL," said John Hunter, broadband analyst at Tele-Choice, Inc. "It will be interesting to see if [Cisco's] ability to deliver on this end-to-end proposal [does that]."

The 626 modem is targeted at consumers, and small and



Cisco's CPE product portfolio enables service providers to deliver cost-effective DSL solutions targeted at every category of end user.

branch offices. The device attaches to PCs and other devices via a 25M bit/sec ATM interface. The modem then sends PPP data in ATM cells over DSL lines so that information can be easily switched at the service provider point of presence. The 676 router features a 10/100M bit/sec Ethernet connection, allowing LAN users to access DSL services.

The 1401 router is targeted at small businesses and small branch offices. The 1401 is an Ethernet-to-ATM25 multiprotocol router that provides asymmetric DSL connectivity by attaching to the ATM25 port on an external ADSL modem, such as the 626. The 1401 is designed to provide security, firewall, virtual private network and qualityof-service capabilities.

The 3600 network module slides in the 3600 branch office router and provides ADSL connectivity through an ATM25 link to an external router, such as the 626. The module is designed to allow 3600 router users to perform multiprotocol routing and voice-over-IP transmissions over ADSL lines.

The 626 and 676 will ship in October. Pricing will be announced then. The 1401 will enter field trials in September and will be priced at \$1,395.

The 3600 Network Module is available now for \$2,200.

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DSL Continued from page 1

promising wide-area access technologies, carrying broadband data over regular telephone wires. It has the potential to make fast and cheap Internet access common, and provide inexpensive and efficient highspeed remote access to corporate networks.

Users naturally are excited about moving to DSL, but at the same time, their heads are spinning from trying to sort out all the different varieties.

"I still get confused with ADSL, SDSL, xDSL," said Keith Waldorf, chief information officer of Employers Medical Network, Inc. in San Jose, Calif., who has actually bought a 1.5M bit/sec DSL connection.

Waldorf spent a lot of time researching the technology before buying the service from Northpoint Communications, Inc., but last week was still surprised to learn about even more DSL flavors.

Waldorf is concerned that the hardware he had to buy to support the service may be useless if he switches to another carrier that uses a different flavor of DSL to support its services. "I said, 'OK then, who am I compatible with?' I'm in the same boat as everybody else. I don't know what the standards will be."

Help on the way?

A group of industry heavyweights has gotten together to solve the multiple-flavor problem — by coming up with yet another flavor. The Universal ADSL Working Group (UAWG) is pushing to standardize a lightweight customer DSL modem that can talk to anybody's service provider modem — as long as the provider's modem also meets the standard.

The UAWG includes the major European and U.S. regional phone companies, as well as Microsoft Corp., Intel Corp., Compaq Computer

Corp. and most DSL hardware makers.

The UAWG collaboration is all well and good, but some members of the group seem at odds with the goal. Nortel, Paradyne Corp. and Rockwell Semiconductor Systems endorse the goal of universal DSL, but also produce technologies that are not fully in sync with the previously proposed UAWG guidelines.

In addition, there is no guarantee from some UAWG members that they will endorse the official standard, which will be called G.Lite, according to Ken Krechmer, who sits on the International Telecommunication Union (ITU) committee considering G.Lite. The UAWG is providing input into the ITU standards process.

The wealth of DSL flavors and dearth of standards has made phone companies cautious about rolling out DSL services. In the meantime, new competitive local carriers have stepped up with aggressive DSL rollouts, but the carriers have to work around the limitations.

For example, Covad Communications, Inc. in San Francisco offers DSL at speeds from 144K bit/sec to 1.5M bit/sec. But to do that the carrier uses two different DSLs — ISDN-based DSL and rate adaptive DSL.

Also, to make the provision-

ing of its services simpler, Covad tosses out the ability DSL has to carry a separate voice channel on the same wires.

Because DSL is costly and complex to offer as a service, it probably won't become widely available until after 2000, according to Neil Spicher, president of Twenty-first Century Consultants in Sacramento, Calif., which advises on DSL services.

Providers that do offer DSL will do so only where they can draw a high number of users in a small area, he said.

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A DSL for everybody

DSL technology comes in so many flavors that it leaves users' heads spinning.

ADSL: The original asymmetric flavor that can run close to 8M bit/sec downloads and 640K bit/sec uploads.

CDSL: Consumer DSL, a Rockwell DSL proposal that can be installed without extra hardware to filter the data stream from the voice channel.

EtherLoop: A DSL variant from Nortel with a maximum speed of 10M bit/sec over very short wires. EtherLoop is silent unless data is being transmitted, making it friendly to other services in nearby wires.

HDSL: High-bit-rate DSL is a very stable, four-wire technology commonly used by phone companies to provision T-1 circuits.

HDSL 2: A new technology that will do what HDSL does, only on two wires.

MVL: Despite its acronym, Multiple Virtual Lines is a DSL technology from Paradyne. It is easy to install, and one MVL line supports one modem at every phone extension at a customer site. Devices can talk modem to modem within the same building as if on a LAN.

RADSL: Rate adaptive DSL is a variant of ADSL, but the speeds adjust downward to adapt to line conditions or to create symmetric upload-download speeds.

SDSL: Single-pair HDSL runs at half T-1 speed on a good circuit.

UDSL: Universal DSL is the proposed standard that is similar to CDSL, but this DSL flavor has the backing of Microsoft, Intel, Compaq, the regional Bell operating companies, the major European telcos and most DSL hardware vendors. A UDSL standard is being pushed through in hopes that UDSL products will be on the shelves for Christmas.

VDSL: Very-high-bit-rate DSL can support 52M bit/sec downloads over short spans.

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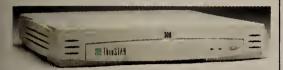
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Thin clients

Continued from page 1

incorporate a set of mainly Intel-developed hardware, software and firmware to make the terminals easy to manage from a central location. As Windows terminals, they will connect to Microsoft's soon-tobe-released Windows NT Server 4.0 Terminal Server Edition (TSE).

These management capabilities could play an important role in validating Microsoft's thin-client strategy by giving MIS managers a consistent set of features for monitoring, controlling and upgrading the desktop devices.



NCD's Windows terminal prototype will have Inteldeveloped hardware, software and firmware so the device can be remotely managed over a network.

NCD's existing ThinStar Windows terminals fit into a stand that holds the slim box upright, like a bookend. By contrast, the new, flat lean-client design makes room for a larger number of peripherals connections, including a Universal Serial Bus and a 10/100Base-T network interface, according to Jim Fulton, vice president of product management for NCD, located in Mountain View, Calif.

Among the features of the lean-client prototype displayed at PC Expo will be power management, to minimize electricity demand, and the wake-on-LAN technology pioneered by IBM and now part of Intel's Wired for Management program. Wake-on-LAN lets remote administrators switch on a PC or terminal and then upgrade or add to its soft-

Although the draft lean-client guidelines called for a 100-MHz Pentium microprocessor, Fulton said the prototypes might have a range of processor

Final products will be available to customers later this year, Fulton said. He declined to give any further details, including whether the management technologies would add to the price of Windows terminals, initially expected to cost between \$500 and \$700.

Currently, the new breed of Windows terminals designed for Microsoft's TSE have little in the way of consistent management features or capabilities.

Citrix Systems, Inc.'s MetaFrame software, which runs on top of TSE, will let managers cluster TSE servers together and balance traffic loads across the servers. But there are few, if any, tools that can take control of the desktop terminal or trigger an alert if some hardware or software component on the client fails.

Shifting strategy

Intel announced plans to develop the lean client guidelines last December, and promised that a final document would be released by April, after being reviewed by computer and terminal builders. But Intel has changed its approach, according to Ron Peck, director of platform marketing with Intel's business desktop group. "We're still in the process of continually revising [the document], based on input from our OEMs," he said.

Intel has created a reference design, now in the hands of several OEMs. As the OEMs work up prototypes — including building and running the lean clients — Intel will make changes to the guidelines based on their input, he said.

Intel now puts much less emphasis on minimum hardware and software requirements for lean clients, he said.

Instead, the focus is on creating a consistent set of technologies for networking X86 Intel processor-based lean-client device of whatever type. "We're giving the [OEMs] an underlying baseline of consistency, and they can build whatever they want on top of it," Peck said.

See Thin clients, page 80

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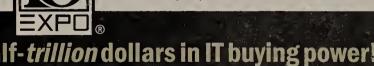
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Cabletron

Continued from page 1 WANs and service provider networks.

Cabletron has been reselling YEAR FORE Systems, Inc. enterprise ATM switches since 1992. Cabletron will continue to offer FORE gear until the



companies' agreement expires in 2002, sources said.

The ATM switches Cabletron recently obtained through the acquisition of Digital Equipment Corp.'s Network Products Group will be targeted

at service providers, sources said.

"They pretty much have the water-

front covered with their own ATM stuff now, plus the Digital stuff," said Ron Jeffries, principal at Jeffries Research in Arroyo Grande, Calif. "The 6500 is very competitive. It's priced right [and has a] good feature set."

The 6500 features a 10-slot chassis. Two of the slots house redundant, nonblocking switch fabric modules, while eight

hold I/O modules. The I/O modules include four-port 155M bit/sec OC-3, four-port 45M bit/sec DS-3 and singleport 622M bit/sec OC-12 interfaces.

The SmartSwitch 6500 sports a 10G bit/sec cell transfer bus and 6.4G bit/sec frame bus backplane for simultaneous LAN and ATM switching.

The switch can run SmartSwitch 6000 LAN switching modules. The backplanes can be interconnected using Cabletron's High Speed Interface Module uplink. The buffers on the 6500 are 512K cells deep.

The 6500 will compete against FORE's 10G bit/sec ASX-1000; Bay Networks, Inc.'s 10G bit/sec Centillion 1600; 3Com Corp.'s CoreBuilder 7000HD; and Cisco Systems, Inc.'s Catalyst 5500, LightStream 1010, and upcoming 20G bit/sec LightStream ATM switch.

Cabletron's current ATM switches the SmartSwitch 2500 and SmartSwitch 9500 — sport 2.5G bit/sec and 30G to 75G bit/sec of bandwidth, respectively. The 6500 will cost \$1,100 per OC-3 port and about \$6,000 per OC-12 port, sources said. The switch will ship in July, they said.

> Get more information online at www.nwfusion.com. DocFinder: 7328

Asked if OEMs were showing a high

"There's still tremendous turmoil in

level of interest, Peck was noncommittal.

the vendor community over who is

going to build what devices," he said.

"We'll continue to plug away, maintain

relationships with the major players and

fine-tune our guidelines. Once we have

it all locked down, then we'll get more

December was widely seen as a belated

reaction to the fast-growing market for

non-PC network devices, including

everything from automobile and hand-

held computers to Web phones. Nearly

all of these run neither Microsoft

Windows, which is too big, nor Intel

microprocessors, which are either too

lean client outlined a device without a

hard drive, a 100-MHz Intel Pentium microprocessor, a range of memory recommendations, the Intel-based manage-

ment features, and APIs for software and

firmware. Intel selected NCD to build

the prototype Windows terminals based

on the guidelines and made an equity investment in the thin-client vendor.

will be on display at NCD's PC Expo

booth, starting June 16, at the Javits

The prototype lean-client terminals

The original draft guidelines for the

Intel's embrace of lean clients last

Thin clients

Continued from page 79

publicly aggressive."

big, too costly or both.

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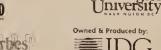
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Have you heard this one electronically?

he average cost of rehabilitating a seal after the Exxon Valdez oil spill in Alaska was \$80,000. At a special ceremony, two of the most expensively saved animals were released back into the wild amid cheers and applause from onlookers. A minute later they were both eaten by a killer whale. — This and the following excerpts are from a May 14 Oracle Service Humor Mailing List message (www.oraclehumor.com).

In one of the e-mail lists I subscribe to (a big hello to all you "Netscribes" subscribers out there) one of our colleagues asked for our thoughts "on that semispam, net humor . . . why people pass it around, where it comes from and whether [it

is] a bad thing or merely a thing."

To answer the last question first, I don't think net humor is a bad thing or "merely a thing" — I firmly believe it is a good thing (that sounds strangely like Martha Stewart, but I digress).

E-mail, particularly in the corporate world, can be a very dry medium if all you're doing is discussing meetings, projects, plans and schedules. But get a joke or two and suddenly e-mail becomes conversational, something to become engaged with rather than resent.

I believe that jokes via e-mail are hugely important in making people feel comfortable with the alien technologies of networking. For a start, I would guess that most people would pay a lot less attention to e-mail if they didn't get the occasional chuckle and the pleasure of sending the better laughs to their own mailing lists.

In 1992, Frank Perkins of Los Angeles made an attempt on the world flagpole-sitting record. By the time he had come down, eight hours short of the 400-day record, his sponsor had gone bust, his girl-friend had left him and his phone and electricity had been cut off.

But there is another kind of e-mail chatter to consider: News. No, I don't mean newsgroups, I'm referring to tidbits of company or cultural gossip ("Did you hear who's getting promoted . . . ?"), real news items ("Hey,

I just heard Frank Sinatra . . . ") and commentary ("I just ate the Kung Pao Chicken at the Golden Lotus and it was . . . ").

Then there are the extracts that people circulate from the many excellent e-mail-based e-zines available on the 'Net. Among my favorites are Edupage (www.educom.edu), Project Mediaguru (www.mediaguru.org), The mini-Annals of Improbable Research (www.improb.com), News

of the Weird (www.nine.org/ notw/notw.html) and Tasty Bits from the Technology Front (www. tbtf.com).

People love updating each other with the nuggets they glean from their personal noise sources, and they enjoy being updated in turn. Many times a friend

has sent me an item that has triggered an idea for one of my columns.

Two animal rights protesters were protesting the cruelty of sending pigs to a slaughterhouse in Bonn. Suddenly, the pigs, all 2,000 of them, escaped through a broken fence and stampeded, trampling the two hapless protesters to death.

So when you hear some alternately clued executive in your organization bemoaning how "abused" your e-mail system is and how wasteful of resources and staff time e-mail chatter is, you might point out that trivial e-mail is profoundly important. E-mail is becoming the modern equivalent of water-cooler chatter, a way of keeping relationships alive no matter how geographically distributed the parties, a vehicle for communities of common interests and a collaborative filtering mechanism.

Oh yeah, and sometimes you get a laugh out of it as well.

A woman came home to find her husband in the kitchen, shaking frantically with what looked like a wire running from his waist toward the electric kettle. Intending to jolt him away from the deadly current she whacked him with a handy plank of wood by the back door, breaking his arm in two places. A shame as he had merely been listening to his Walkman.

Idle chatter to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.



The latest on the Internet/intranet Industry

By Chris Nerney

SUPERLATIVES 101 Harvard University held its second annual Conference on Internet and Society last week, and from the descriptions of the scheduled speakers on the university's Web site, you'd think that gods were descending on the Cambridge, Mass., campus.

Here's what the program had to say about Sun CEO Scott McNealy: "When he speaks on Wednesday afternoon, not only will Sanders Theater be full, but those who care about the development of the Internet will surely be listening closely to this inspirational and revolutionary figure."

While the theater was pretty full, those who were listening closely heard not inspirational and revolutionary rhetoric, but rather McNealy's usual **Microsoft-bashing** stump speech. Admittedly, he got some good laughs. (Hey, c'mon, these people still think the **Lampoon** is the height of hilarity.)

Of **Oracle CEO Larry Ellison**, the Harvard guide wrote, "He will be at Harvard to speak as a visionary about the world that is fast approaching . . .

Well, Ellison did speak, though he neglected to share his vision of network computers replacing PCs on the corporate desktop, a vision he has revised out of existence. The visionary, however, did favor the crowd with some foaming invectives directed at Microsoft CEO Bill Gates.

And then there was Microsoft Executive Vice President Steve Ballmer, who couldn't leave his antitrust bunker in Redmond to make a personal appearance. Rather, Ballmer spoke to the audience via cybercast.

Of course, you already know that. After all, the Harvard program promised, "When Steve Ballmer speaks to us, the world will be listening."

There is not enough bandwidth in the world to contain such collective hubris.

CAN INFOMERCIALS BE FAR BEHIND? Hard as it is to believe, you may someday come to miss those Internet banner ads.

That's because a start-up is about to inflict upon cyberspace new technology that enables advertisers to run full-screen Internet ads.

IC Systems of Santa Ana, Calif., says the Internet is not drawing enough national brand advertisers because of the inherent limitations of banner ads.

CEO Tom Amon says the company's new Internet Commercial (IC) Systems method delivers to Web surfers full-screen, broadcast-style ads — the kind of format with which more traditional advertisers are most comfortable.

OK, we can get behind something that increases Internet advertising revenue. Sadly, things turn ugly as we learn more about IC's technology. Web sites using IC's software can *force* visitors to view full-page ads before they are allowed to see the information for which they came.

"Before selected content can be accessed, a commercial message is displayed in a full-screen format," Amon says. "After the full commercial message has been executed, the user's intended content appears on screen."

It gets worse. The first company to launch full-page ads on the Internet will be an unnamed national fast-food chain.

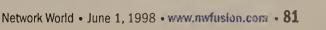
Our recurring nightmare of logging on and being greeted by that annoying **Taco Bell dog** may be one step closer to reality.

START-UP SECURES \$3.7 MILLION VENTURE DEAL. Network security start-up **NetScreen Technologies, Inc.** today will announce its first round of venture funding, a \$3.7 million deal with **Sequoia Capital.**

NetScreen, based in Santa Clara, Calif., recently introduced its \$10,000 flagship product, NetScreen-100. The product combines firewall, virtual private network encryption and traffic management on a single dedicated hardware platform based on a secure packet processor Application Specific Integrated Circuit design. (The "100" stands for megabits per second.) This enables network managers to manage a single device instead of three.

NetScreen also has a less expensive version of its security product, NetScreen-10, which costs about \$4,000. Founded in October 1997, the company until now has relied on private angel investors for funding.

Any reader who sends us their best, most interesting Internet-related news and gossip is nothing less than a paradigm-shifting, out-of-the-box-thinking, history-making son of a gun. And we mean that. Contact Chris Nerney at (508) 820-7451 or enerney@nww.com.



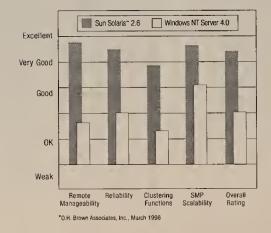
RUNNING E APPLICATIONS C

Whatever you choose to do in the privacy of your own office is your business. But if you rely on a Microsoft

Windows NT Server to run your company's key business applications, the result could be torturous. In fact,

according to D.H. Brown, servers running on Windows NT "continue to fall short of being able to support

enterprise requirements.*" So why not indulge in something a bit less agonizing? The Sun™ Enterprise™ 450



Workgroup Server, starting below \$15,000, not only delivers print and

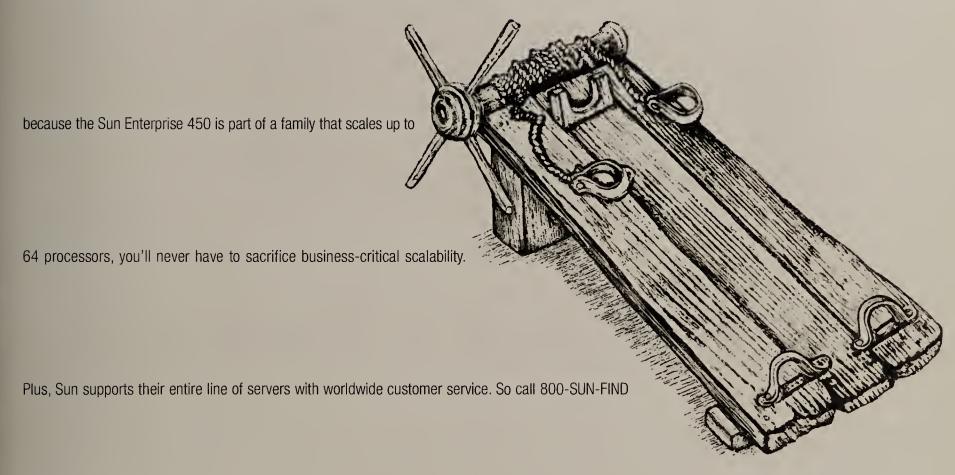
file services for your PCs and workstations, it runs multiple enterprise applications at the same time.

WHAT IS IT DO FO

*Refers to D.H. Brown Associates, Inc., Solans Outpaces NT For Enterprise's Intranets, March 1998 Study companing Microsoft's Windows NT Server 4.0 with Sun's Solans 2.6 operating environment. ©1998 Sun Microsoftems, Inc. All rights reserved.

NTERPRISE NAN NT SERVER?

Not to mention, it whipped NT in datawarehousing, Lotus Domino, Web and SAP performance. And



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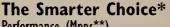
The SmartSwitch Router.

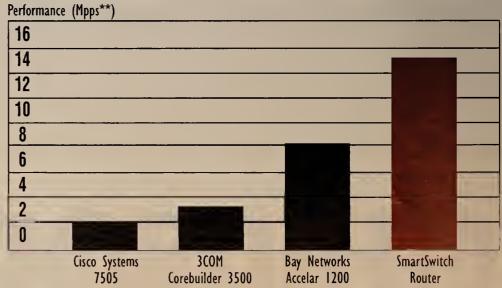
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